Cantilever bimetallic beam bending

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1 Objective

Verify Coreform IGA for Abaqus on a **two-material** problem: a bimetallic cantilever whose cross-section stacks a stiff layer on a flexible layer, bent by gravity, body force, surface pressure, surface traction, and a concentrated end moment. Each load case is checked against the transformed-section Euler-Bernoulli solution, whose bending stress is discontinuous at the material interface — the feature that distinguishes this problem from its single-material counterpart. The quantity of interest is the tip deflection; the deflection curve and the bending-

and shear-stress distributions through the two-material section are also compared against the closed forms along line probes. Two interface workflows are exercised: the two layers merged into a single part sharing interface nodes, and separate parts joined by a tie constraint. All numerical inputs use the millimeter—tonne—second (MMTS) consistent unit system.

2 Geometry

A prismatic two-layer beam of width b and length L is shown in Figure 1, with its dimensions provided in Table 1. A flexible layer of height h_f lies below the interface plane, and a stiff layer of height h_s lies above it. The interface lies on the $y = 0$ plane, the cross-section is centered on the x origin, and the beam axis runs along $z \in [0, L]$. Verification quantities are sampled along three line probes: the interface line at the section center (u_y), and the section lines through the two-material stack at midspan and at the clamped end (σ_{zz} and τ_{zy}).

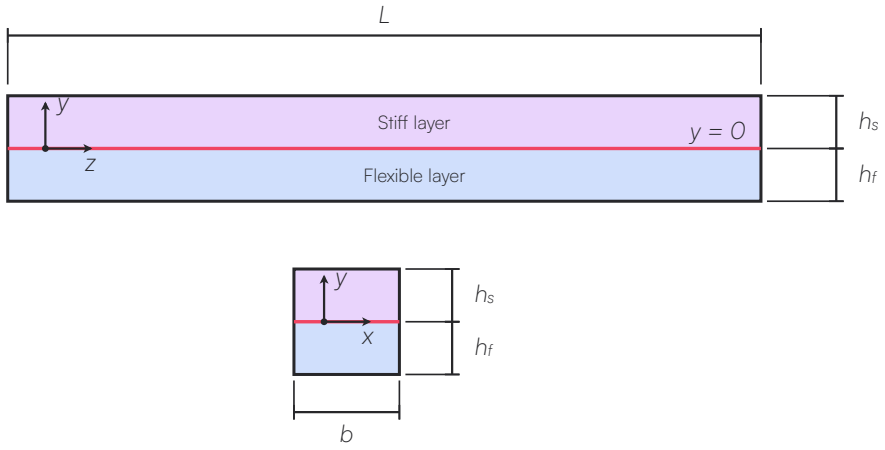


Figure 1: Bimetallic beam geometry: the stiff layer of height h_s lies above $y = 0$, and the flexible layer of height h_f lies below it; both layers have width b and length L.

Table 1: Geometric parameters.

Quantity	Symbol	Value	Unit
Section width	b	10	mm
Flexible-layer height	h_f	5	mm
Stiff-layer height	h_s	5	mm
Length	L	100	mm
Transformed second moment	I_t	1.52×10^3	mm^4

3 Material

Each layer is a homogeneous, isotropic, linear-elastic material (Table 2). Representative copper and tungsten moduli and densities give the properties a familiar engineering scale and provide a useful stiffness and density contrast; they are not intended as material allowables. The stiff layer is four times stiffer than the flexible layer, giving modular ratio $n = E_s/E_f = \modularRatio$. Poisson's ratio is intentionally idealized to zero in both layers so the 3D solid remains compatible with the Euler-Bernoulli accepted solution, which carries no Poisson effect.

Table 2: Material properties per layer.

Layer	Material	Young's modulus E [$\mathrm{N/mm^2}$]	Poisson's ratio ν	Mass density ρ [$\mathrm{tonne/mm^3}$]
Flexible ($-h_f \le y < 0$)	copper	100×10^3	0	8.90×10^{-9}
Stiff ($0 \le y \le h_s$)	tungsten	400×10^3	0	19.2×10^{-9}

4 Loading & boundary conditions

The idealized composite beam is clamped at $z = 0$, as shown in Figure 2. In the three-dimensional solid models, this condition is imposed by pinning the $z = 0$ face (all translations fixed). Each load case below is applied in its own study. The gravity and body-force cases use identical meshes, material definitions, boundary conditions, and perfectly tied layer interfaces; only the load definition differs.

Figure 2: Idealized clamped boundary condition at $z = 0$.

4.1 Gravity

A gravity load of magnitude $g = 9810\,\mathrm{mm/s^2}$ acts in $-y$ on the whole body, as shown in Figure 3. The flexible and stiff layers contribute their own weights, so the equivalent distributed line load is $w = g\,b\,(\rho_f h_f + \rho_s h_s)$.

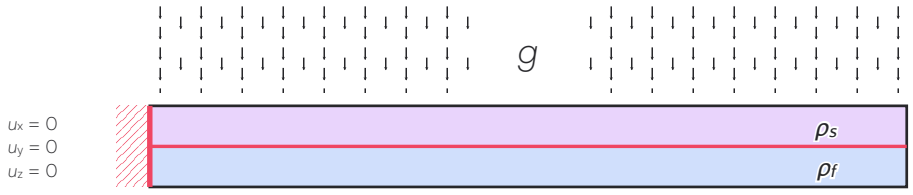


Figure 3: Gravity loading on flexible and stiff layers with densities ρ_f and ρ_s.

4.2 Body force

An explicitly equivalent body force per unit volume acts in $-y$, as shown in Figure 4. Its magnitude is defined separately in each layer as

$$q_f = \rho_f g, \qquad q_s = \rho_s g.$$

The gravity translator supplies g, and Coreform IGA multiplies it by the material density at each quadrature point; the explicit body-force case supplies the resulting q_i directly. Consequently, the two load cases produce the same force density pointwise, rather than merely the same section resultant. The two layers remain separate load targets and are joined by a perfect tie, which represents the ideal bond assumed by transformed-section beam theory.

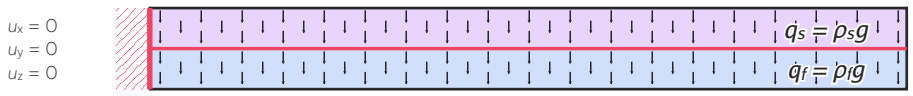


Figure 4: Layer-specific body-force loading in the $-y$ direction, with $q_f = \rho_f g$ in copper and $q_s = \rho_s g$ in tungsten.

4.3 Pressure

A uniform normal pressure is applied to the stiff layer's top face ($y = +h_s$), as shown in Figure 5. It reduces to the equivalent distributed line load w.

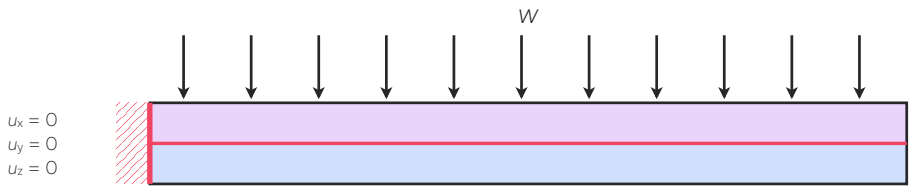


Figure 5: Top-face pressure loading represented by the equivalent line load w.

4.4 Surface traction

A uniform shear traction on the end face ($z = L$) acts in $-y$, giving the resultant tip load $P = t\,b\,(h_f + h_s)$ shown in Figure 6. This load case is also run with the tie-constraint interface workflow.

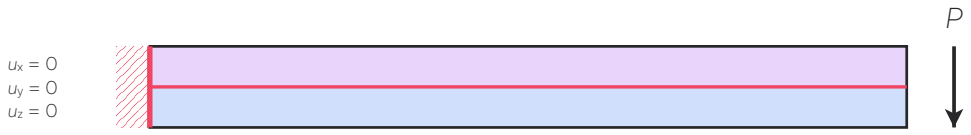


Figure 6: End-face shear traction represented by the resultant tip load P.

4.5 End moment

A concentrated moment M_0 about x is applied at the beam tip, as shown in Figure 7. In the three-dimensional solid models, it is applied to a reference point at the centroid of the end face and transmitted through a kinematic coupling to the whole face.

Figure 7: Concentrated end moment M_0 about the x axis.

Table 3: Applied load magnitudes.

Load case	Test case	Magnitude	Unit
Gravity	`gravity`	9.81×10^{3}	$\mathrm{mm/s^2}$
Body force	`body_force`	Copper: 87.3×10^{-6} Tungsten: 188×10^{-6}	$\mathrm{N/mm^3}$
Pressure	`pressure`	1.00×10^{-3}	$\mathrm{N/mm^2}$
Surface traction	`traction`	10.0×10^{-3}	$\mathrm{N/mm^2}$
End moment	`moment`	5	$\mathrm{N \cdot mm}$

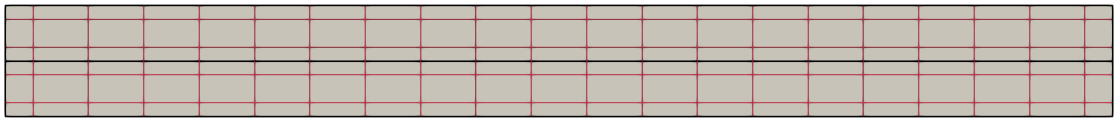
5 Mesh & discretization

Coreform IGA discretizes the beam with **immersed, trimmed U-splines**: a structured rectilinear background grid with p padding elements per side is trimmed to the beam. The background element sizes are $(5, 5, 10)/2^k$ in (x, y, z) for refinement levels $k = 0, ..., 3$, at degrees $p = 1, 2$, and 3 with maximum continuity C^{p-1} within each layer. The material interface is resolved by the geometry rather than the grid: in the merged workflow the two layers form one part whose interface faces share nodes, and in the tie workflow the layers remain separate parts coupled by a tie constraint. Every load case runs on this same mesh sweep, so the meshes

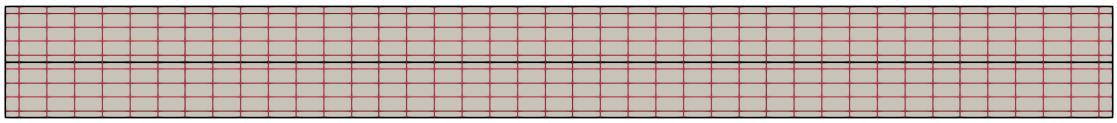
are shown once — the tabs below render each refinement level from the gravity study's IGA results databases.

5.0.a h_z=10

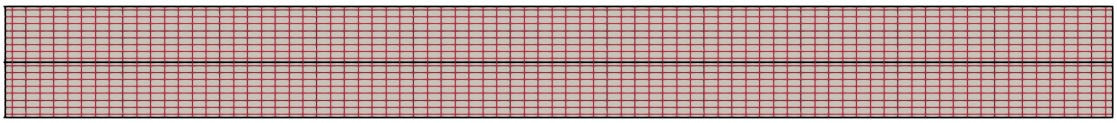
5.0.b h_z=5



5.0.c h_z=2.5



5.0.d h_z=1.25



6 Reference & accepted solutions

The **accepted** solutions are the transformed-section Euler-Bernoulli closed forms [1]: the stiff layer is scaled by the modular ratio $n = E_s/E_f$ into an equivalent single-material section, giving the neutral-axis height and the transformed second moment of area

$$\bar{y} = \frac{\hat{y}_s\, nA_s + \hat{y}_f\, A_f}{nA_s + A_f}, \qquad I_t = \frac{bh_f^3}{12} + A_f\,(\hat{y}_f - \bar{y})^2 + n\,\frac{bh_s^3}{12} + nA_s\,(\hat{y}_s - \bar{y})^2,$$

where $A_f = bh_f$ and $A_s = bh_s$ are the layer areas and $\hat{y}_f$, $\hat{y}_s$ their centroid heights. For this section the neutral axis sits at $y = \neutralAxis$ — inside the stiff layer, above the material interface. The section resultants $V(z)$, $M(z)$ and the deflection $u_y(z)$ then follow the standard cantilever closed forms with flexural rigidity $E_f I_t$; the distributed cases (gravity, body force, pressure) reduce to a uniform line load w, the traction case to a tip load P, and the end moment to a constant moment M_0. The stresses recover the two-material behavior:

$$\sigma_{zz}(y,z) = -\frac{E(y)}{E_f}\,\frac{M(z)\,(y-\bar{y})}{I_t}, \qquad \tau_{zy}(y,z) = \frac{V(z)\,Q(y)}{I_t\,b},$$

so the bending stress is **discontinuous** at the material interface — it jumps by the factor n — while the shear stress, built from the transformed first moment $Q(y)$, remains continuous. The transformed-section model is itself an approximation of the 3D solid (it neglects shear deformation, and the pinned end face is stiffer than the idealized support), so exact agreement is not expected; the acceptance criterion is the tip deflection matching within 5%.

Table 4: Equivalent loads and transformed-section tip deflections.

Load case	Equivalent load	Transformed-section $u_y(L)$ [mm]
Gravity	$w = 13.8 \times 10^{-3}$ N/mm	-1.13×10^{-3}
Body force	$w = 13.8 \times 10^{-3}$ N/mm	-1.13×10^{-3}
Pressure	$w = 10.0 \times 10^{-3}$ N/mm	-822×10^{-6}
Surface traction	$P = 1$ N	-2.19×10^{-3}
End moment	$M_0 = 5$ N · mm	-164×10^{-6}

7 Results

Each load case below reports the tip deflection against the transformed-section value (rows are the h-sweep; one tab per degree, and the degree tabs switch together across load cases), the four verification profiles against the closed forms (one figure per probe quantity, a subfigure per degree), full-span line-probe absolute L^2 self-convergence against the same-degree h_3 profile, and the axial-stress contours for every test case on a shared color scale capped at the transformed-section peak. The midspan and clamped-section stress profiles cross the material interface, where the closed-form bending stress jumps by the modular ratio. The trilinear $p = 1$ cases can lock in bending on the coarser meshes, so those levels are retained as record-only diagnostics; the finest h_3 result carries the same 5% tip-deflection acceptance criterion as the higher-degree cases.

7.1 Gravity

Transformed-section tip deflection: -1.13×10^{-3}.

7.1.a p=1

h_z	u_y tip	vs transformed section
10	-500×10^{-6}	55.8%
5	-880×10^{-6}	22.3%
2.5	-1.08×10^{-3}	4.27%

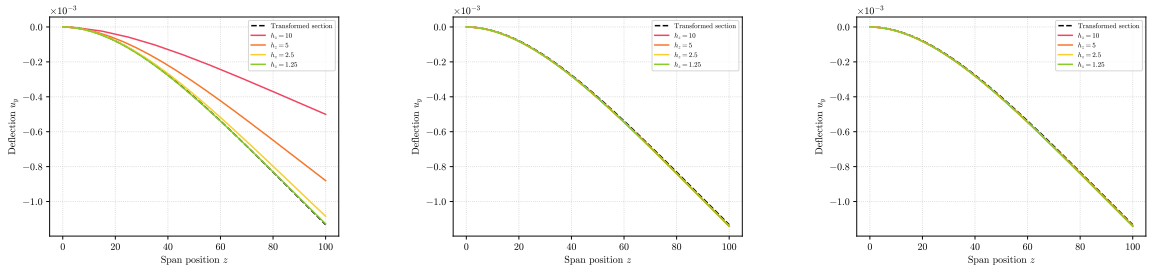
h_z	u_y tip	vs transformed section
1.25	-1.13×10^{-3}	0.42%

7.1.b p=2

h_z	u_y tip	vs transformed section
10	-1.14×10^{-3}	0.682%
5	-1.14×10^{-3}	0.687%
2.5	-1.14×10^{-3}	0.719%
1.25	-1.14×10^{-3}	0.72%

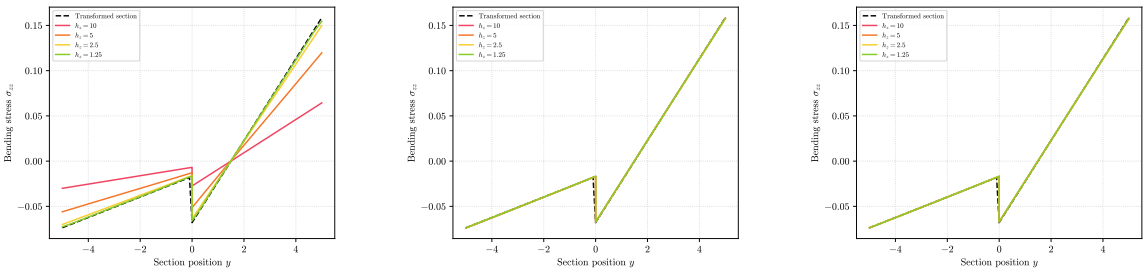
7.1.c p=3

h_z	u_y tip	vs transformed section
10	-1.14×10^{-3}	0.69%
5	-1.14×10^{-3}	0.686%
2.5	-1.14×10^{-3}	0.571%
1.25	-1.14×10^{-3}	0.72%



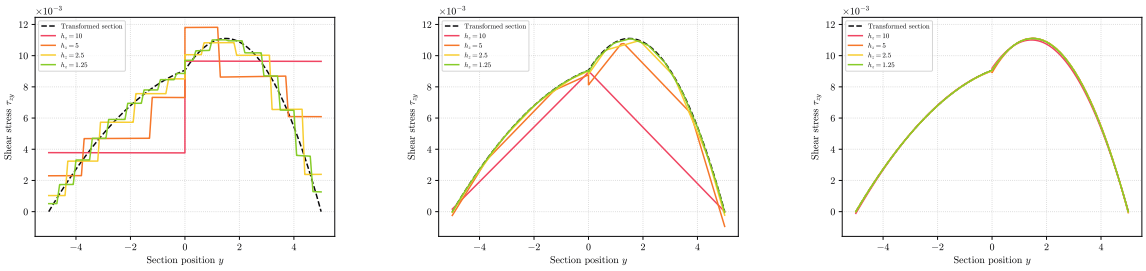
(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 8: Gravity: deflection along the interface line — coarse→fine sweep per degree vs the transformed section.



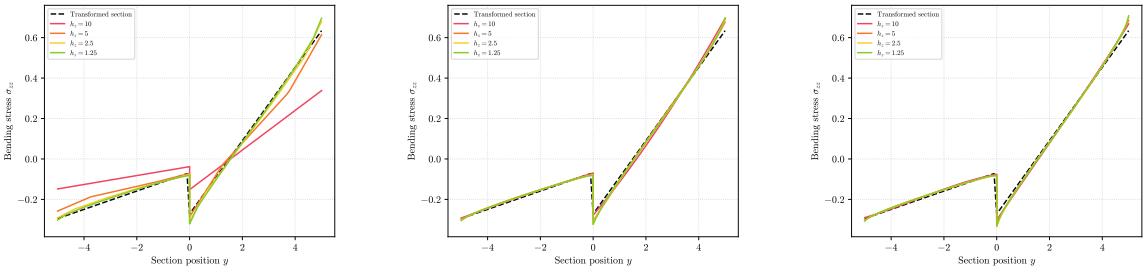
(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 9: Gravity: bending stress through the midspan section — the closed form jumps by the modular ratio at the material interface ($y = 0$).



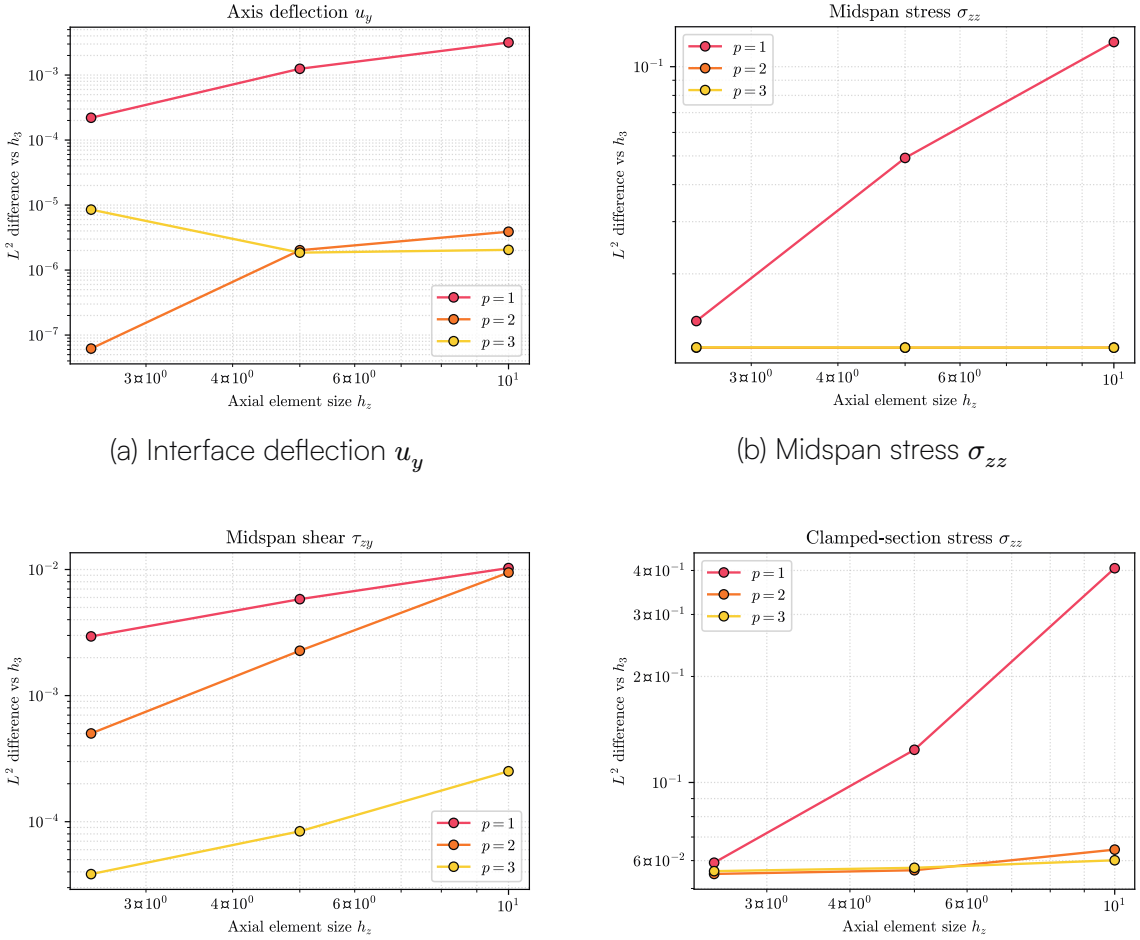
(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 10: Gravity: shear stress through the midspan section — continuous across the interface, with its maximum at the neutral axis.



(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 11: Gravity: bending stress through the clamped section, where the moment (and the interface jump) is largest.



(a) Interface deflection u_y

(b) Midspan stress σ_{zz}

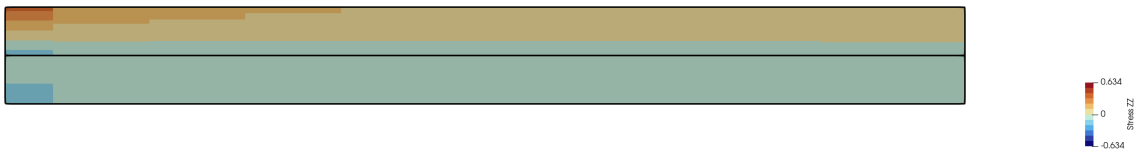
(c) Midspan shear τ_{zy}

(d) Clamped-section stress σ_{zz}

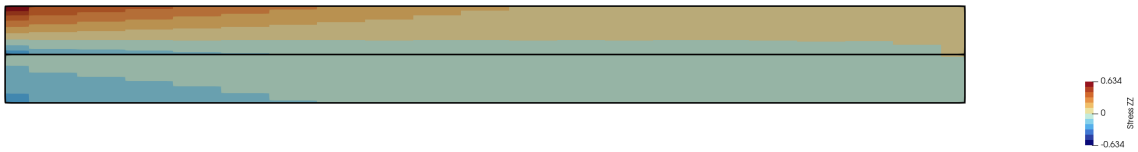
Figure 12: Gravity: full-span line-probe absolute L2 self-convergence. Each degree is compared against its own h3 profile; the h3 point is omitted because its self-error is zero.

7.1.d Contour plots

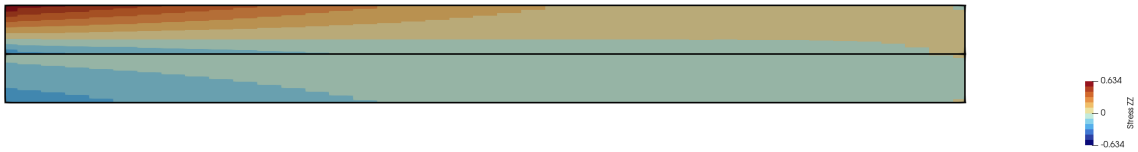
7.1.e h0p1



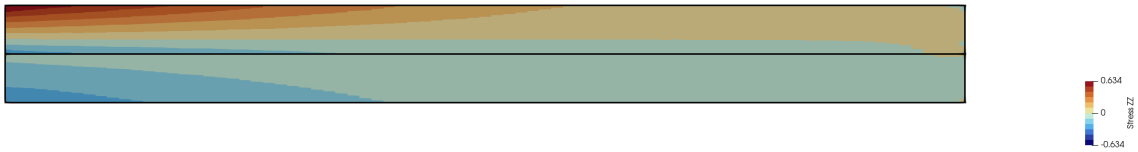
7.1.f h1p1



7.1.g h2p1



7.1.h h3p1



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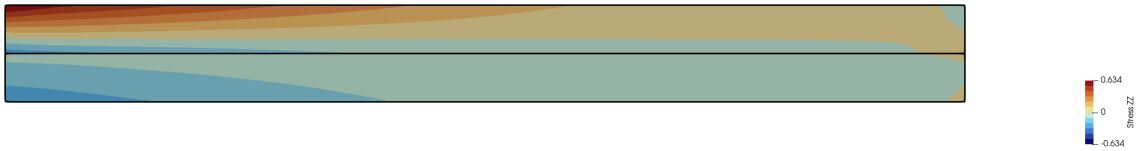
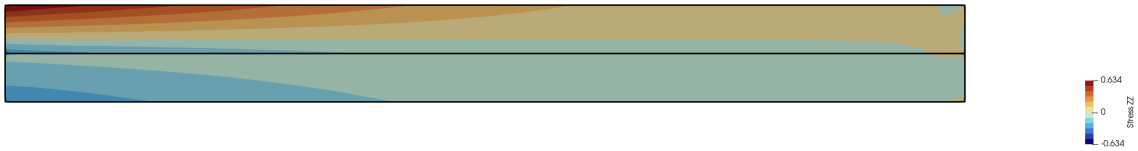


7.1.j h1p2



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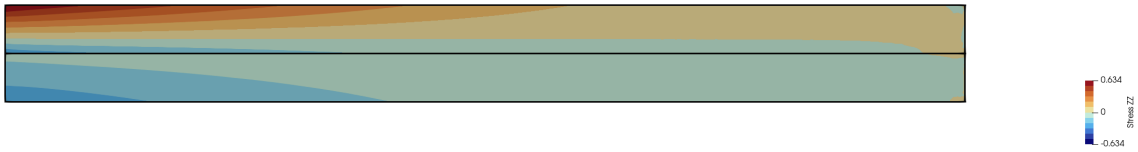
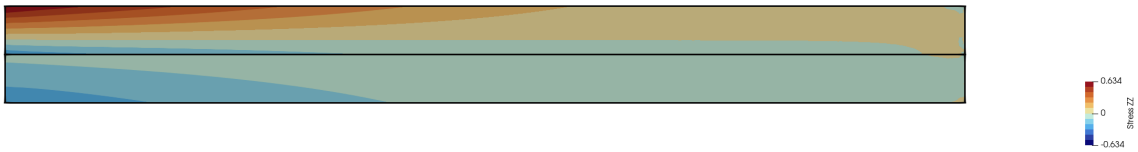


7.1.l h3p2



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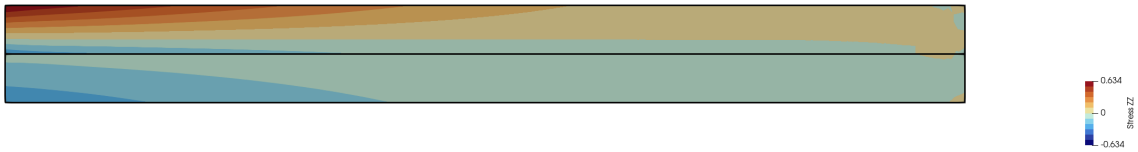

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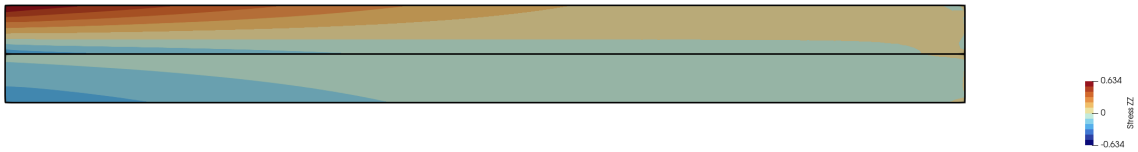

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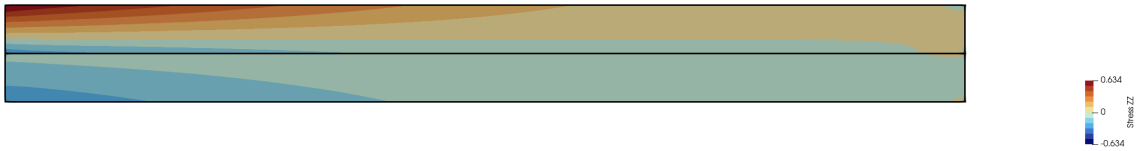
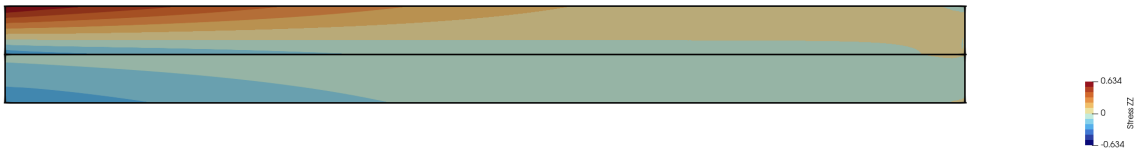


7.1.p h3p3



7.2 Body force

Transformed-section tip deflection: -1.13×10^{-3}.

7.2.a p=1

h_z	u_y tip	vs transformed section
10	-500×10^{-6}	55.8%
5	-880×10^{-6}	22.3%
2.5	-1.08×10^{-3}	4.27%
1.25	-1.13×10^{-3}	0.42%

7.2.b p=2

h_z	u_y tip	vs transformed section
10	-1.14×10^{-3}	0.682%
5	-1.14×10^{-3}	0.687%
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1.25	-1.14×10^{-3}	0.72%

7.2.c p=3

h_z	u_y tip	vs transformed section
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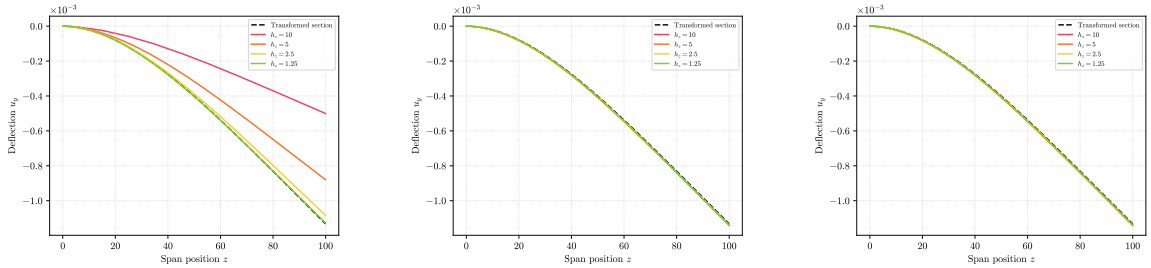
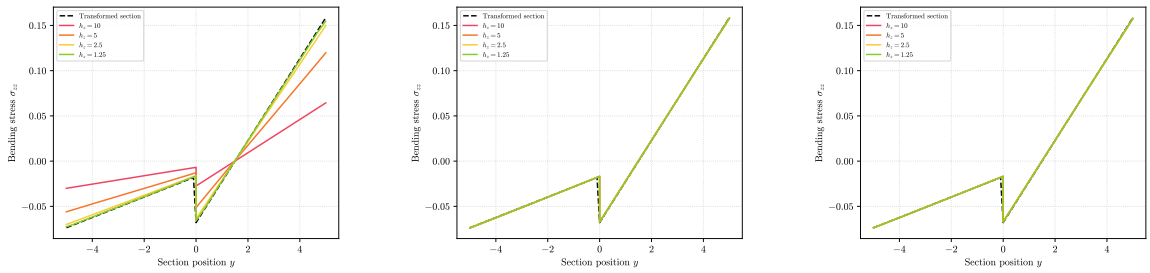
1.25	-1.14×10^{-3}	0.72%



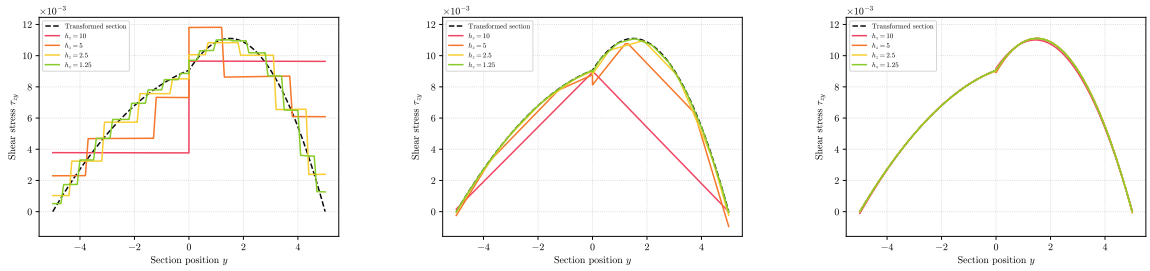
(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 13: Body force: deflection along the interface line — coarse→fine sweep per degree vs the transformed section.



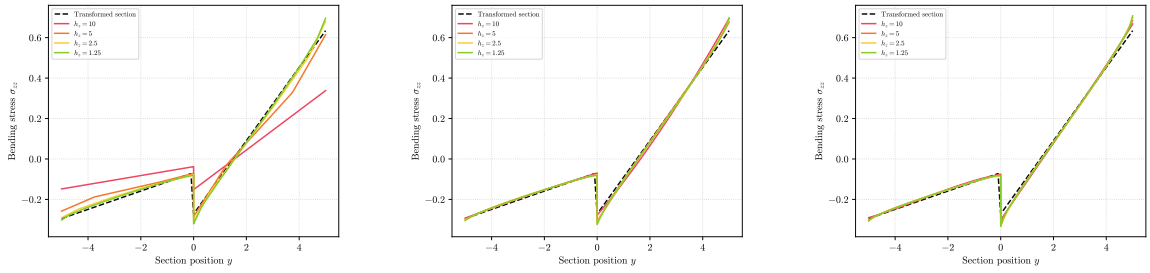
(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 14: Body force: bending stress through the midspan section — the closed form jumps by the modular ratio at the material interface ($y = 0$).



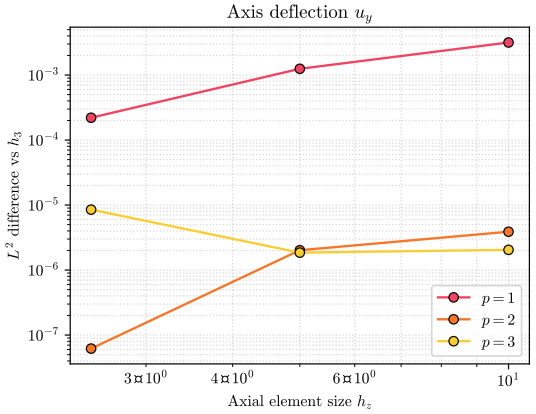
(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 15: Body force: shear stress through the midspan section — continuous across the interface, with its maximum at the neutral axis.

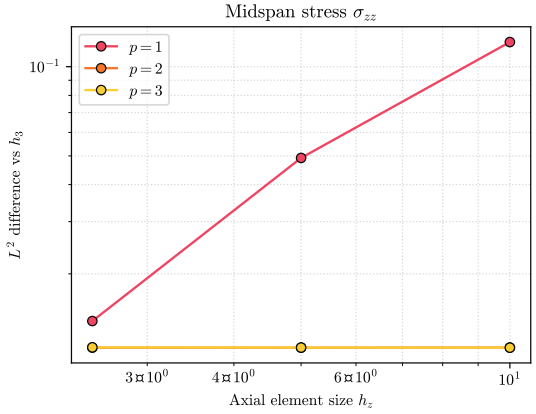


(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

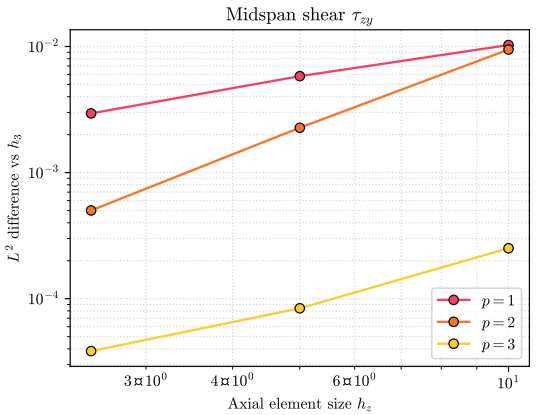
Figure 16: Body force: bending stress through the clamped section, where the moment (and the interface jump) is largest.



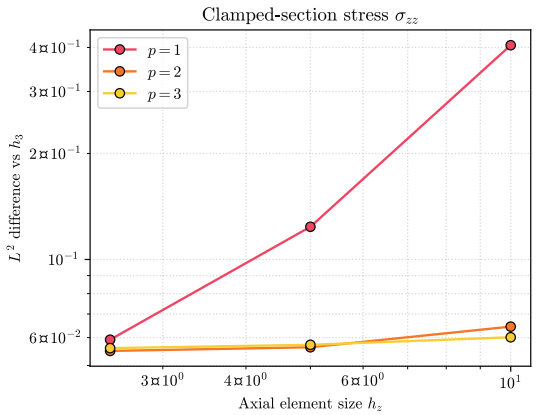
(a) Interface deflection u_y



(b) Midspan stress σ_{zz}



(c) Midspan shear τ_{zy}

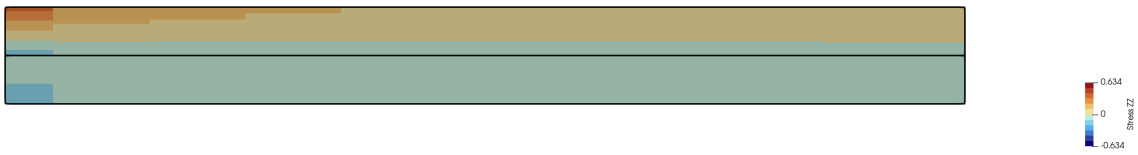


(d) Clamped-section stress σ_{zz}

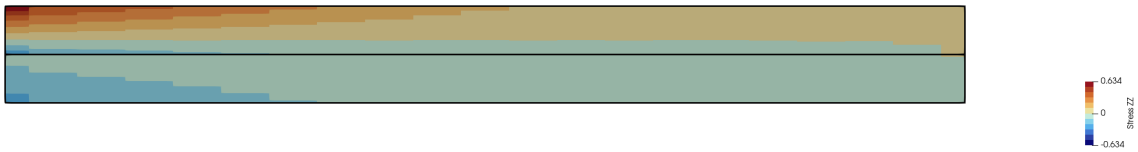
Figure 17: Body force: full-span line-probe absolute L2 self-convergence. Each degree is compared against its own h3 profile; the h3 point is omitted because its self-error is zero.

7.2.d Contour plots

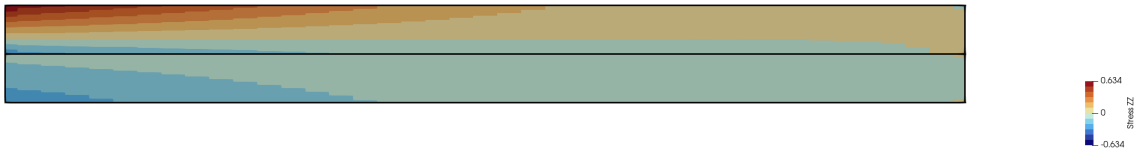
7.2.e h0p1



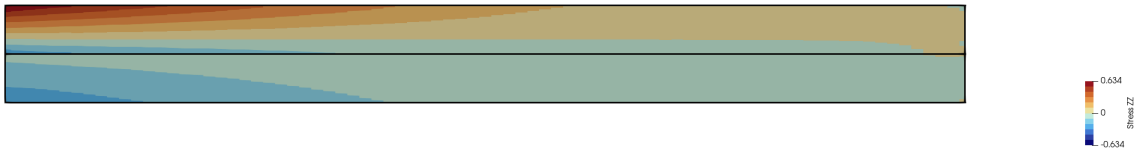
7.2.f h1p1



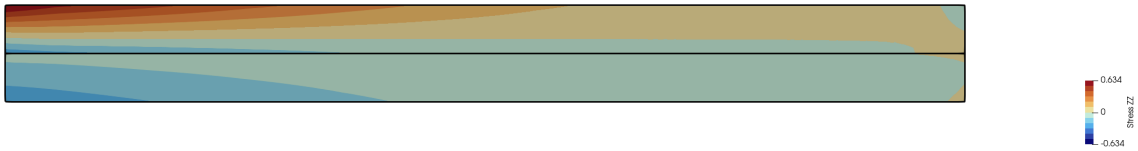
7.2.g h2p1



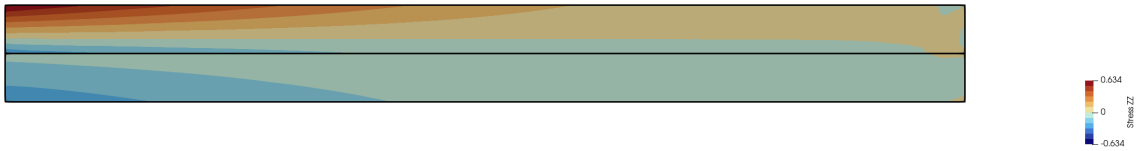
7.2.h h3p1



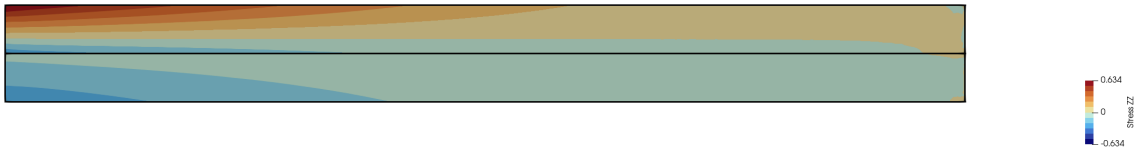
7.2.i h0p2



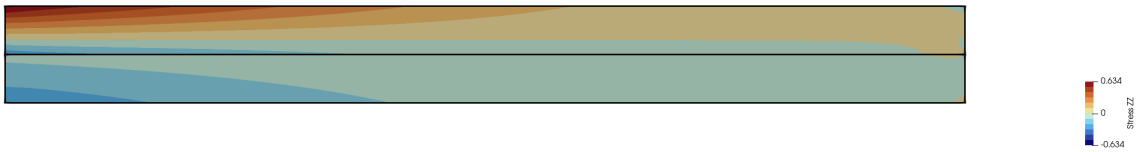
7.2.j h1p2



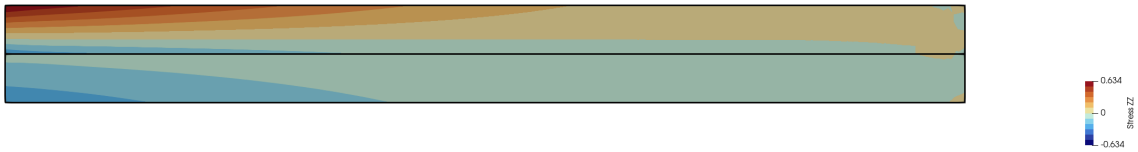
7.2.k h2p2



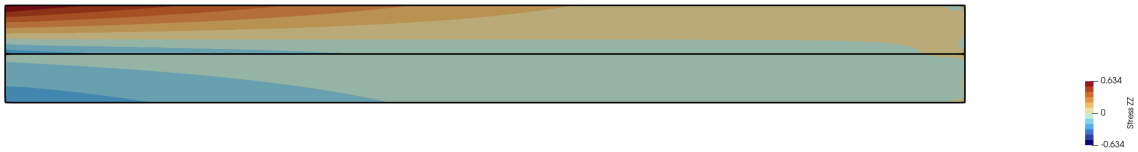
7.2.l h3p2



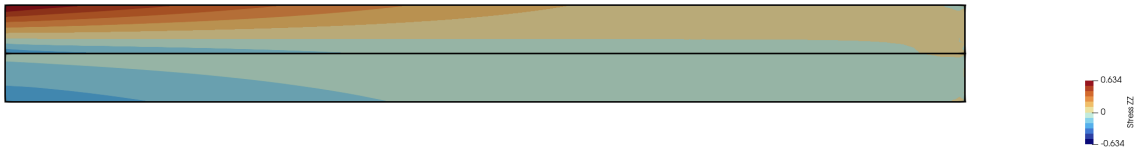
7.2.m h0p3



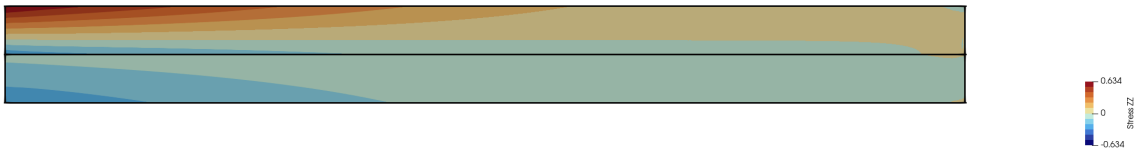
7.2.n h1p3



7.2.o h2p3



7.2.p h3p3



7.3 Pressure

Transformed-section tip deflection: -822×10^{-6}.

7.3.a p=1

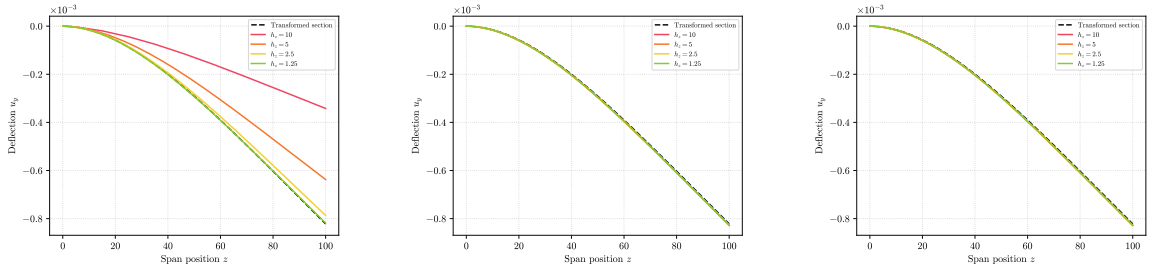
h_z	u_y tip	vs transformed section
10	-342×10^{-6}	58.4%
5	-637×10^{-6}	22.4%
2.5	-787×10^{-6}	4.27%
1.25	-818×10^{-6}	0.417%

7.3.b p=2

h_z	u_y tip	vs transformed section
10	-827×10^{-6}	0.642%
5	-828×10^{-6}	0.716%
2.5	-828×10^{-6}	0.72%
1.25	-828×10^{-6}	0.72%

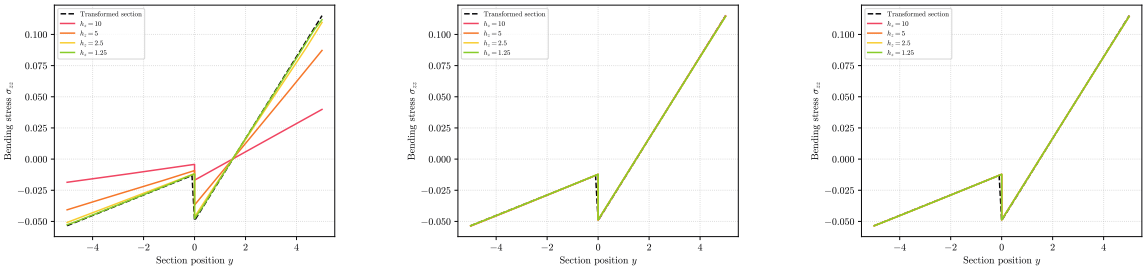
7.3.c p=3

h_z	u_y tip	vs transformed section
10	-828×10^{-6}	0.72%
5	-828×10^{-6}	0.72%
2.5	-828×10^{-6}	0.721%
1.25	-828×10^{-6}	0.72%



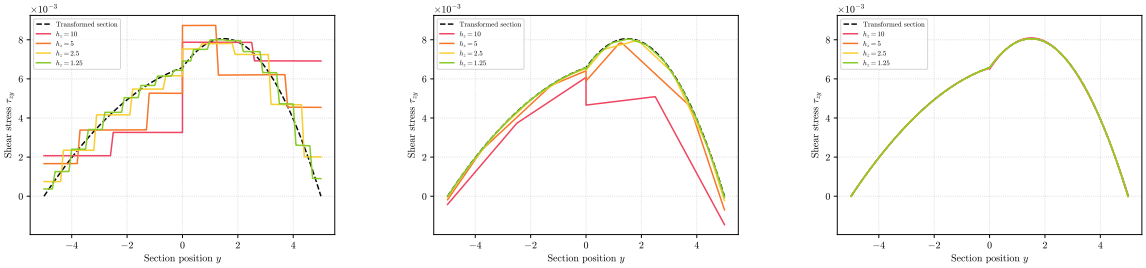
(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 18: Pressure: deflection along the interface line — coarse→fine sweep per degree vs the transformed section.



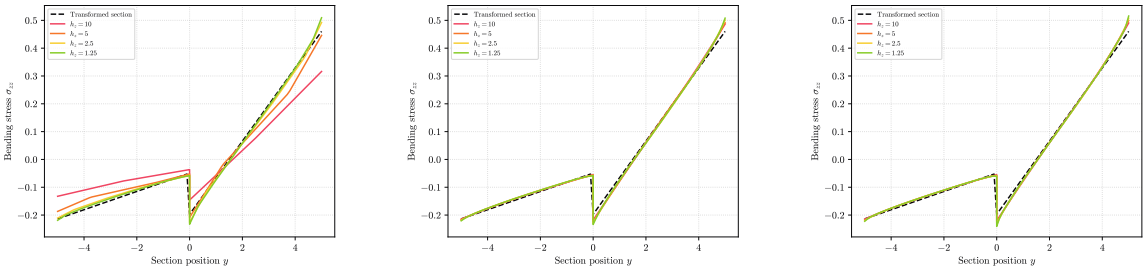
(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 19: Pressure: bending stress through the midspan section — the closed form jumps by the modular ratio at the material interface ($y = 0$).



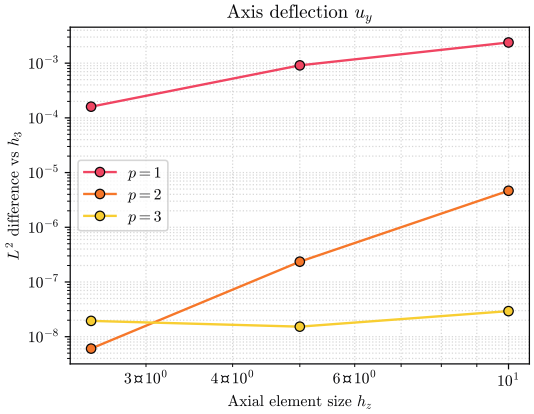
(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 20: Pressure: shear stress through the midspan section — continuous across the interface, with its maximum at the neutral axis.

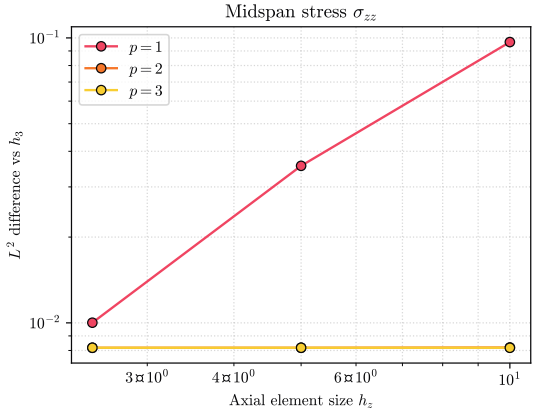


(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

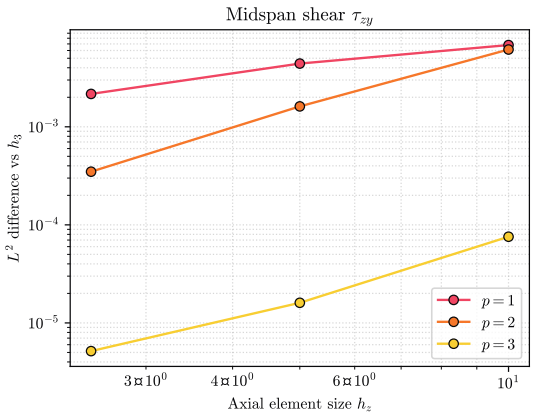
Figure 21: Pressure: bending stress through the clamped section, where the moment (and the interface jump) is largest.



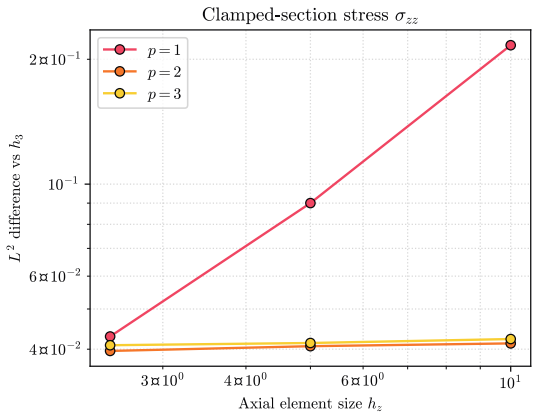
(a) Interface deflection u_y



(b) Midspan stress σ_{zz}



(c) Midspan shear τ_{zy}

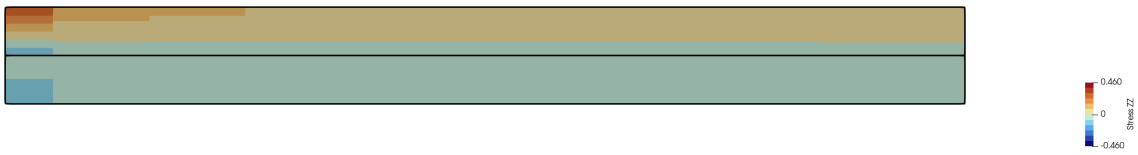


(d) Clamped-section stress σ_{zz}

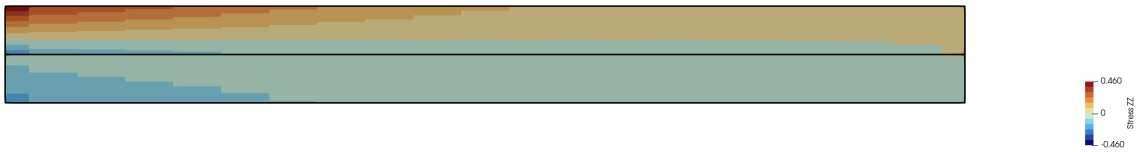
Figure 22: Pressure: full-span line-probe absolute L2 self-convergence. Each degree is compared against its own h3 profile; the h3 point is omitted because its self-error is zero.

7.3.d Contour plots

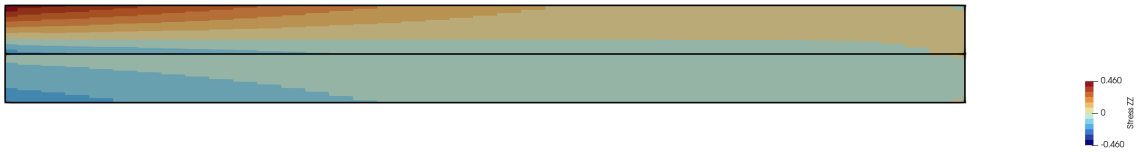
7.3.e h0p1



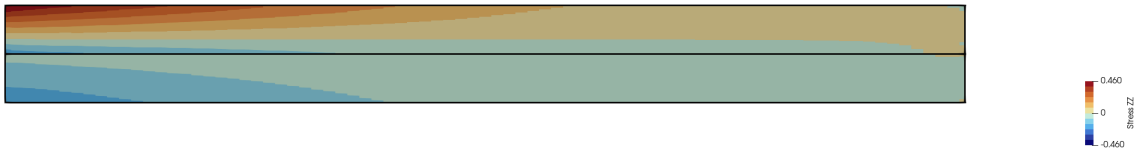
7.3.f h1p1



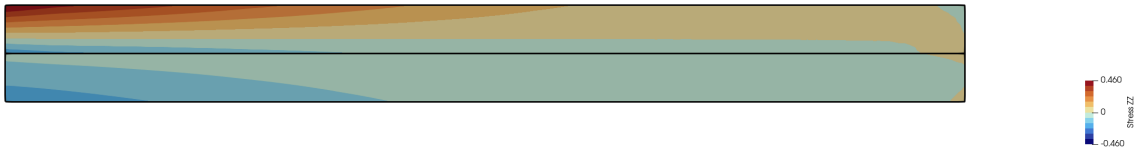
7.3.g h2p1



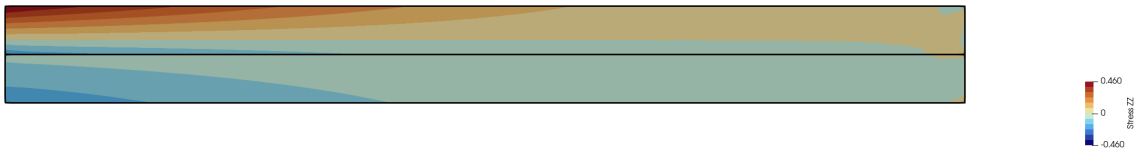
7.3.h h3p1



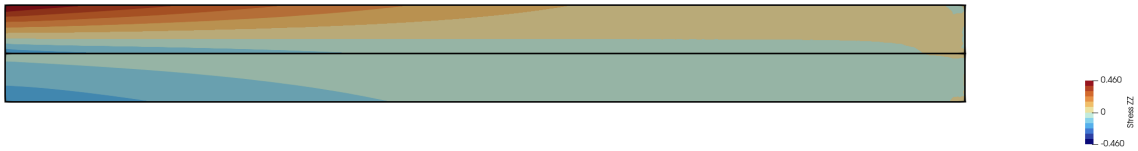
7.3.i h0p2



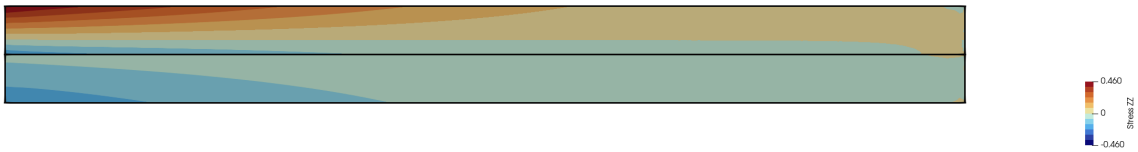
7.3.j h1p2



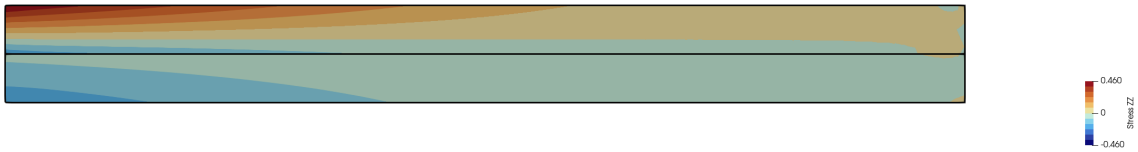
7.3.k h2p2



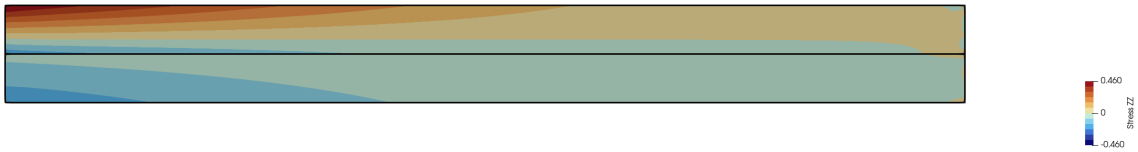
7.3.l h3p2



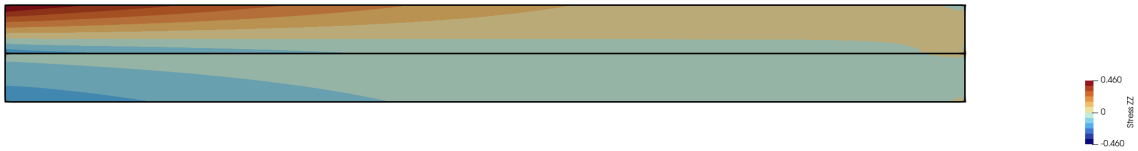
7.3.m h0p3



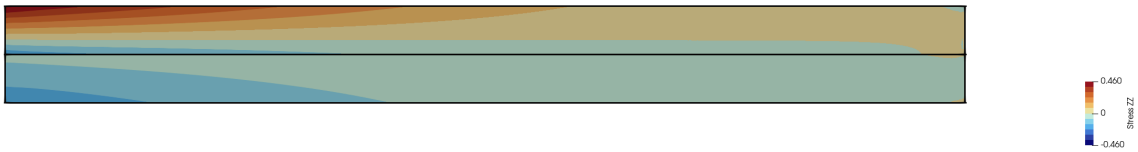
7.3.n h1p3



7.3.o h2p3



7.3.p h3p3



7.4 Surface traction

Transformed-section tip deflection: -2.19×10^{-3}.

7.4.a p=1

h_z	u_y tip	vs transformed section
10	-874×10^{-6}	60.1%
5	-1.69×10^{-3}	23%
2.5	-2.09×10^{-3}	4.51%
1.25	-2.18×10^{-3}	0.606%

7.4.b p=2

h_z	u_y tip	vs transformed section
10	-2.20×10^{-3}	0.483%
5	-2.20×10^{-3}	0.537%
2.5	-2.20×10^{-3}	0.54%
1.25	-2.20×10^{-3}	0.539%

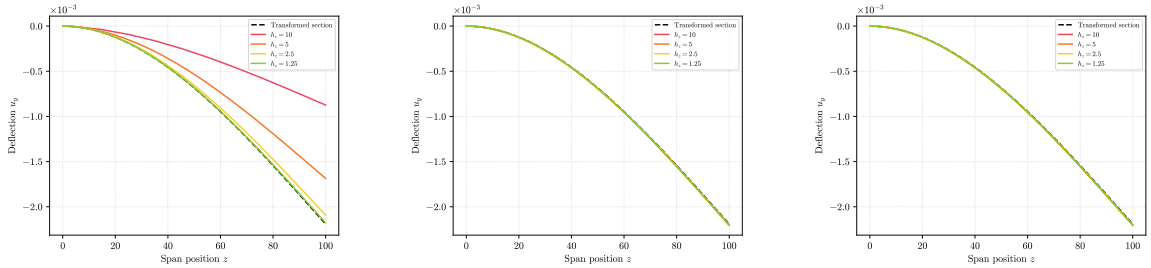
7.4.c p=3

h_z	u_y tip	vs transformed section
10	-2.20×10^{-3}	0.54%
5	-2.20×10^{-3}	0.54%
2.5	-2.20×10^{-3}	0.54%
1.25	-2.20×10^{-3}	0.54%

The traction studies also run with the **tie-constraint** interface workflow: the two layers remain separate parts and are joined by a tie constraint instead of sharing interface nodes. Both workflows discretize the same problem, so their tip deflections must agree (Table 5).

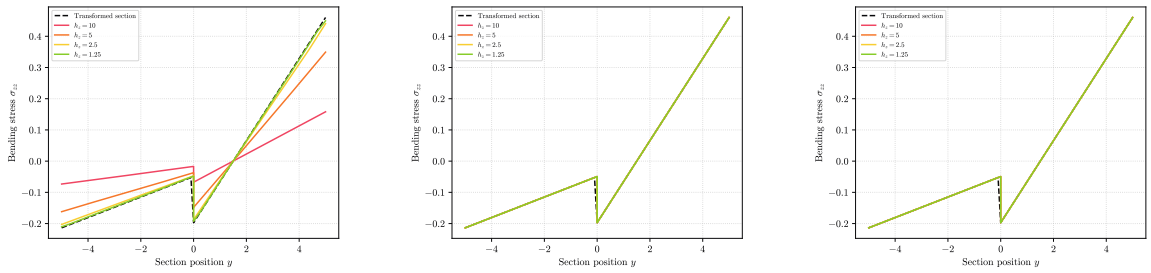
Table 5: Interface workflows compared on the traction case.

Degree	Interface workflow	u_y tip (finest level)	vs transformed section
p=1	Merged part (shared interface nodes)	-2.18×10^{-3}	0.606%
p=1	Tie constraint between separate parts	-2.18×10^{-3}	0.609%
p=2	Merged part (shared interface nodes)	-2.20×10^{-3}	0.539%
p=2	Tie constraint between separate parts	-2.20×10^{-3}	0.539%
p=3	Merged part (shared interface nodes)	-2.20×10^{-3}	0.54%
p=3	Tie constraint between separate parts	-2.20×10^{-3}	0.54%



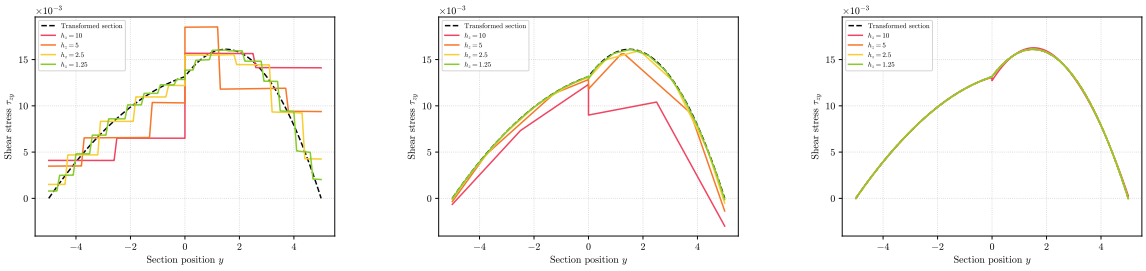
(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 23: Surface traction: deflection along the interface line — coarse→fine sweep per degree vs the transformed section.



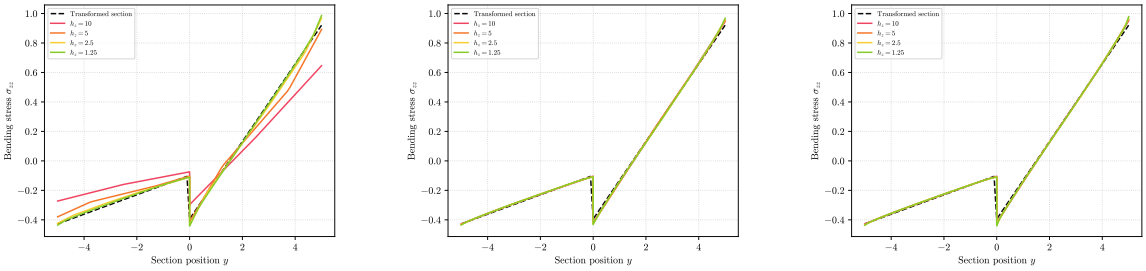
(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 24: Surface traction: bending stress through the midspan section — the closed form jumps by the modular ratio at the material interface ($y = 0$).



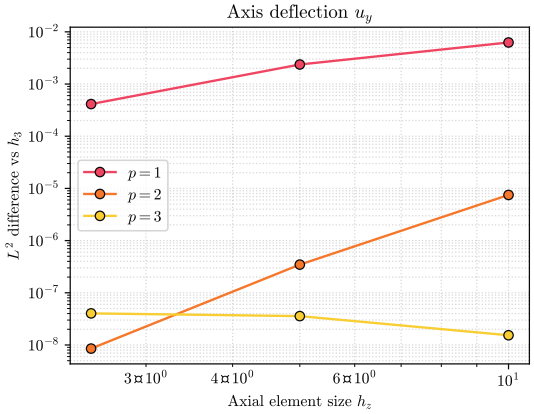
(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

Figure 25: Surface traction: shear stress through the midspan section — continuous across the interface, with its maximum at the neutral axis.

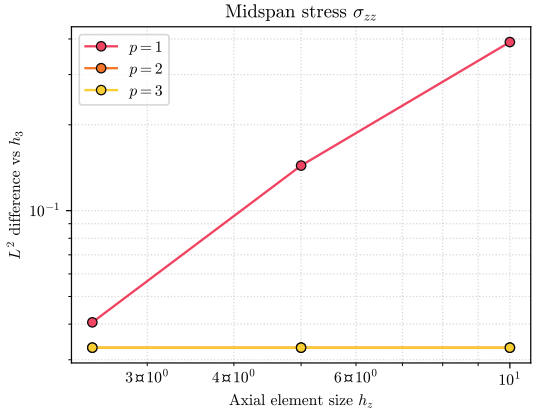


(a) $p = 1$ (b) $p = 2$ (c) $p = 3$

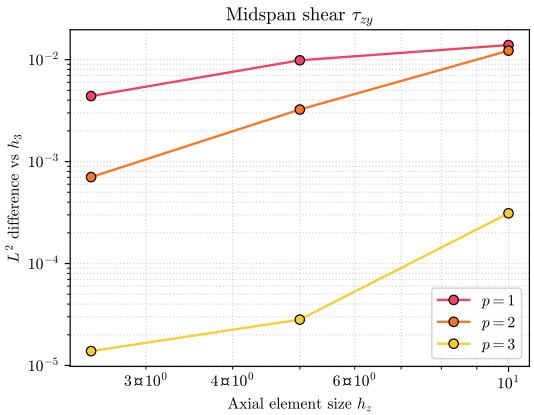
Figure 26: Surface traction: bending stress through the clamped section, where the moment (and the interface jump) is largest.



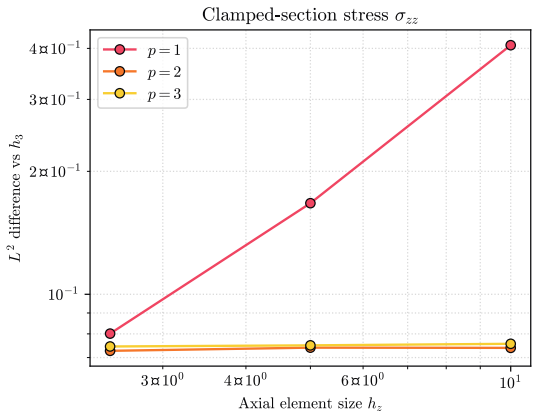
a(a) Interface deflection u_y



a(b) Midspan stress σ_{zz}



a(c) Midspan shear τ_{zy}



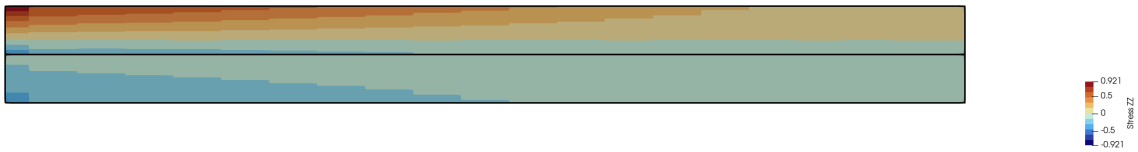
a(d) Clamped-section stress σ_{zz}

Figure 27: Surface traction: full-span line-probe absolute L2 self-convergence. Each degree is compared against its own h3 profile; the h3 point is omitted because its self-error is zero.

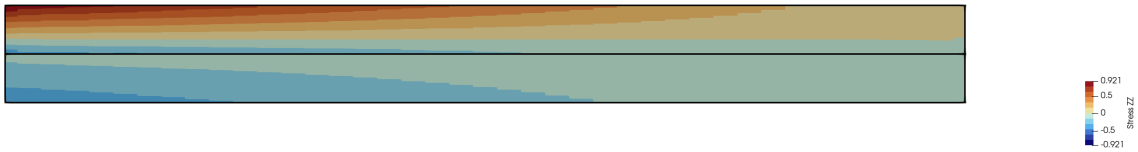
7.4.d Contour plots

7.4.e h0p1

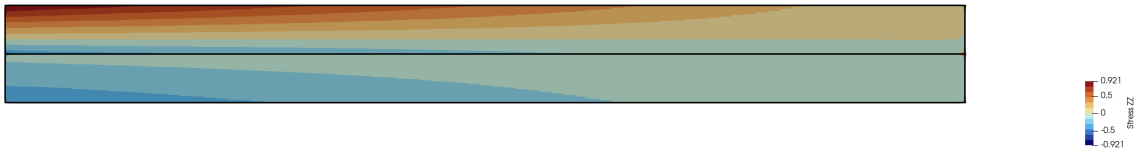
7.4.f h1p1



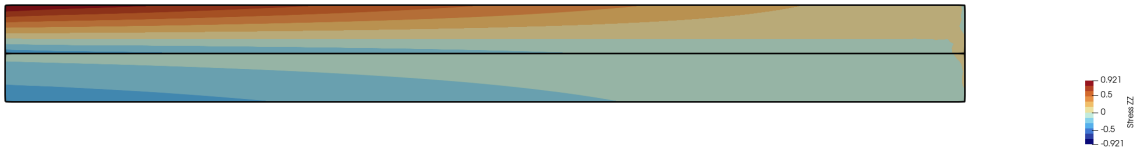
7.4.g h2p1



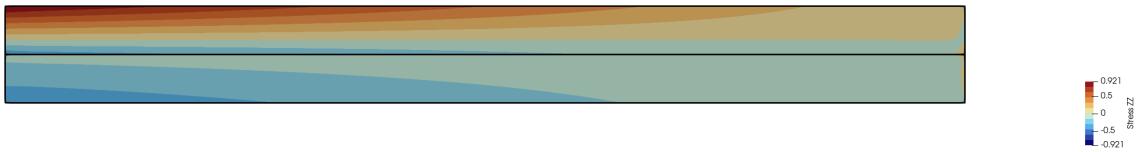
7.4.h h3p1



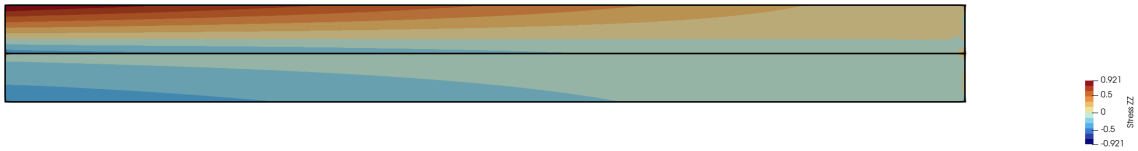
7.4.i h0p2



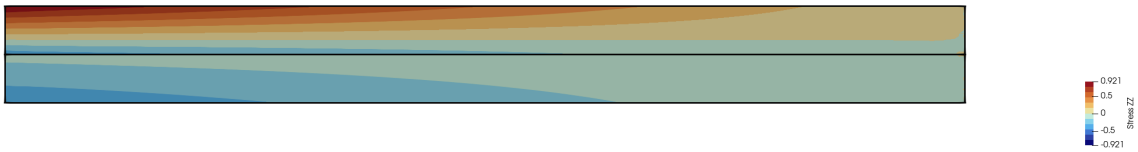
7.4.j h1p2



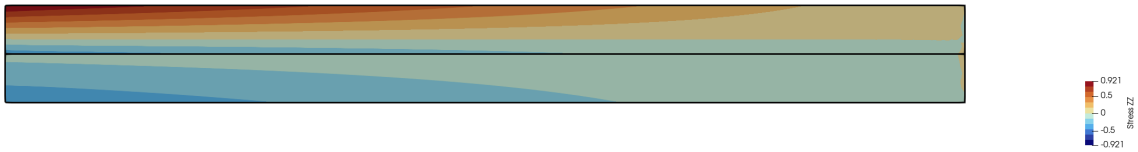
7.4.k h2p2



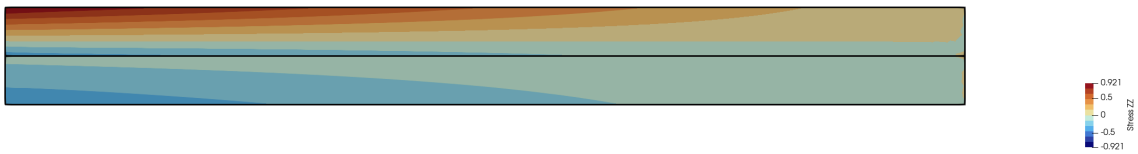
7.4.l h3p2



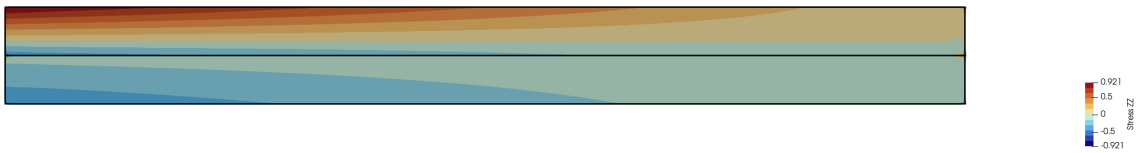
7.4.m h0p3



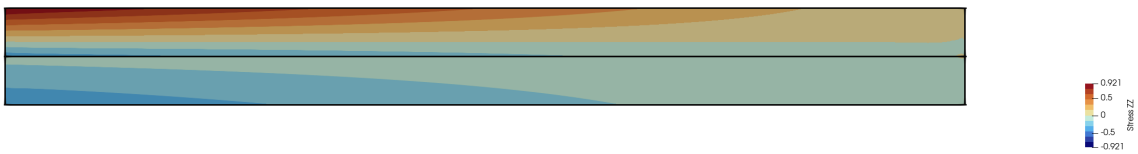
7.4.n h1p3



7.4.o h2p3



7.4.p h3p3



7.5 End moment

Transformed-section tip deflection: -164×10^{-6}.

7.5.a p=1

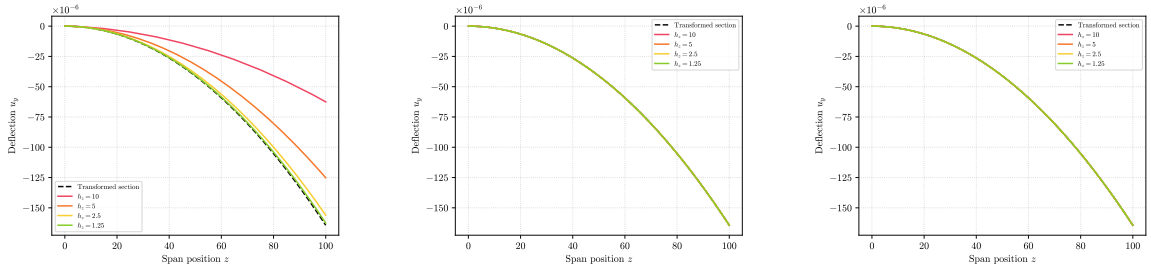
h_z	u_y tip	vs transformed section
10	-62.5×10^{-6}	62%
5	-125×10^{-6}	23.8%
2.5	-156×10^{-6}	5.06%
1.25	-163×10^{-6}	1.14%

7.5.b p=2

h_z	u_y tip	vs transformed section
10	-164×10^{-6}	0.00139%
5	-164×10^{-6}	0.00157%
2.5	-164×10^{-6}	0.00142%
1.25	-164×10^{-6}	0.00122%

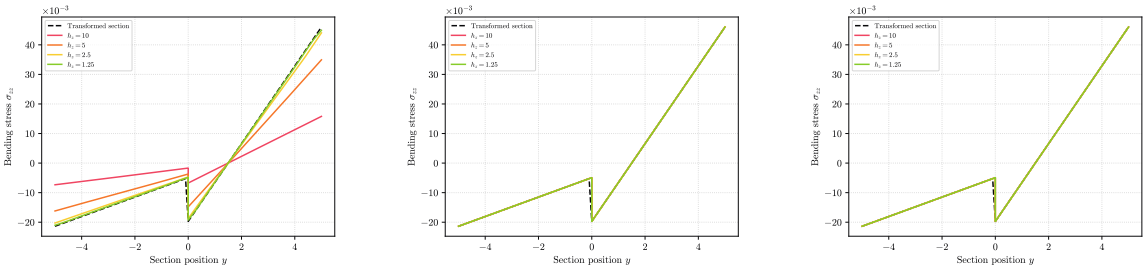
7.5.c p=3

h_z	u_y tip	vs transformed section
10	-164×10^{-6}	0.00146%
5	-164×10^{-6}	0.00154%
2.5	-164×10^{-6}	0.00155%
1.25	-164×10^{-6}	0.00133%



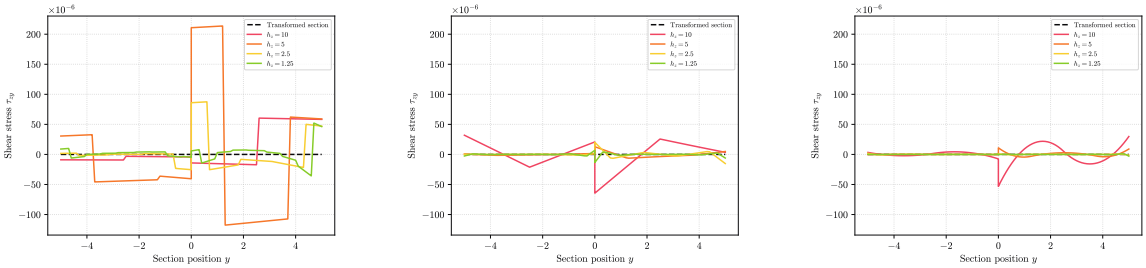
b(a) $p = 1$ b(b) $p = 2$ b(c) $p = 3$

Figure 28: End moment: deflection along the interface line — coarse→fine sweep per degree vs the transformed section.



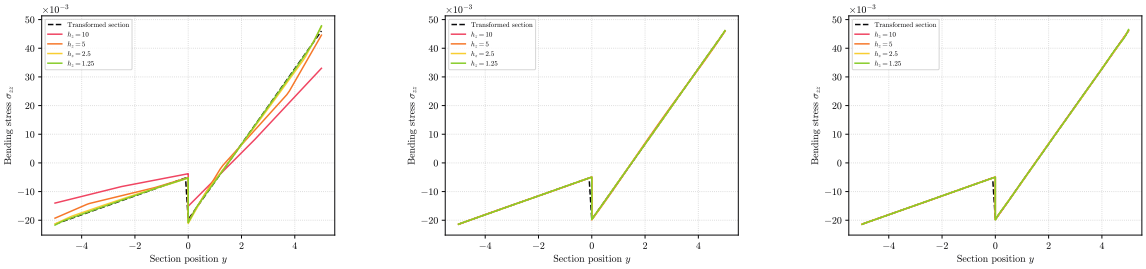
c(a) $p = 1$ c(b) $p = 2$ c(c) $p = 3$

Figure 29: End moment: bending stress through the midspan section — the closed form jumps by the modular ratio at the material interface ($y = 0$).



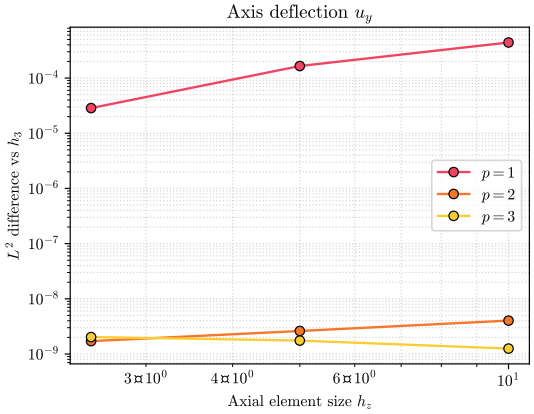
d(a) $p = 1$ d(b) $p = 2$ d(c) $p = 3$

Figure 30: End moment: shear stress through the midspan section — the closed-form shear is identically zero for a constant moment.

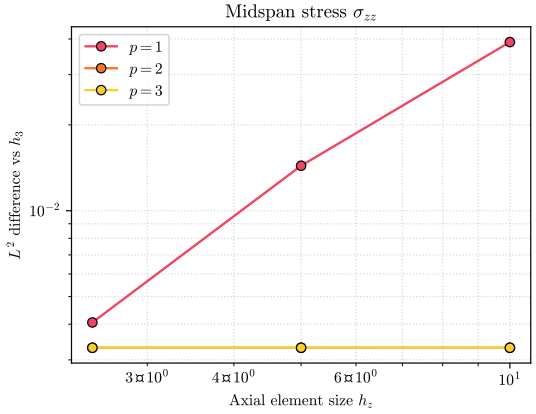


e(a) $p = 1$ e(b) $p = 2$ e(c) $p = 3$

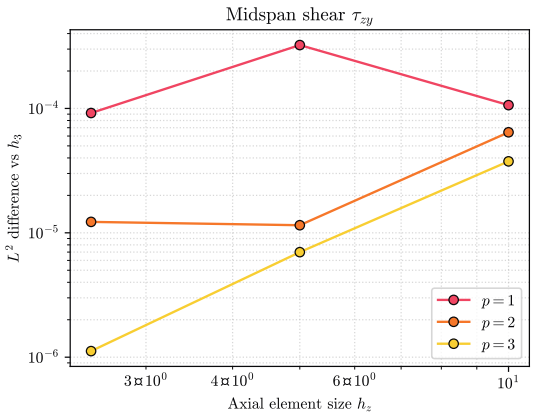
Figure 31: End moment: bending stress through the clamped section — for a constant moment the interface jump is the same at every section.



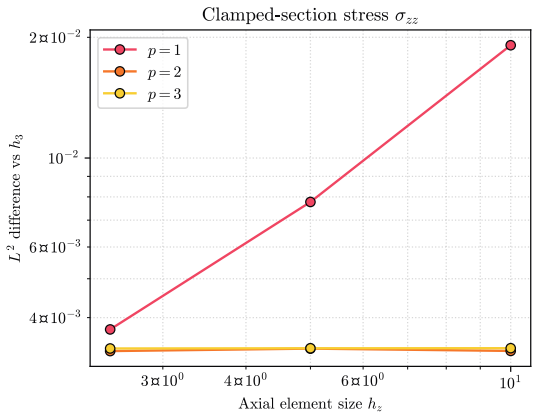
f(a) Interface deflection u_y



f(b) Midspan stress σ_{zz}



f(c) Midspan shear τ_{zy}

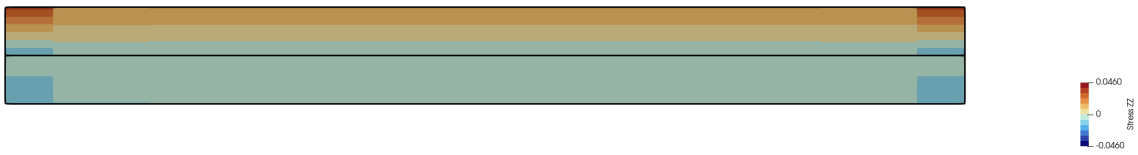


f(d) Clamped-section stress σ_{zz}

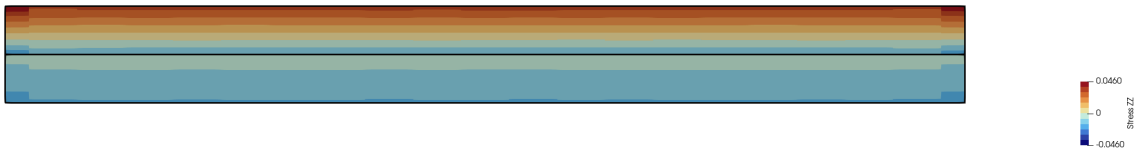
Figure 32: End moment: full-span line-probe absolute L2 self-convergence. Each degree is compared against its own h3 profile; the h3 point is omitted because its self-error is zero.

7.5.d Contour plots

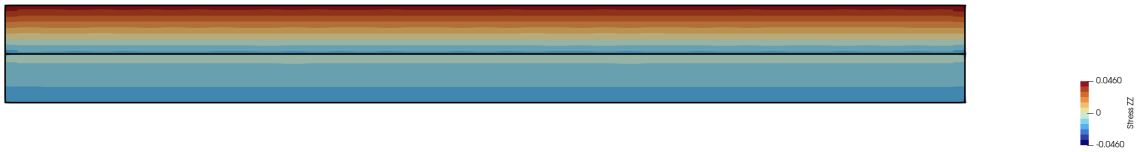
7.5.e h0p1



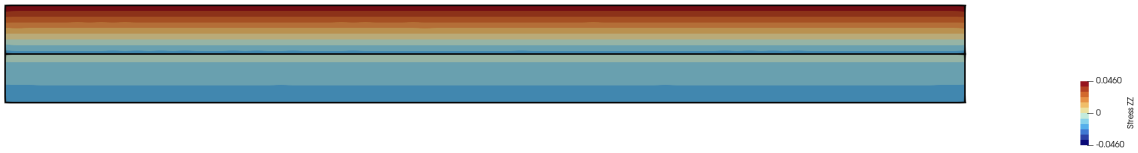
7.5.f h1p1



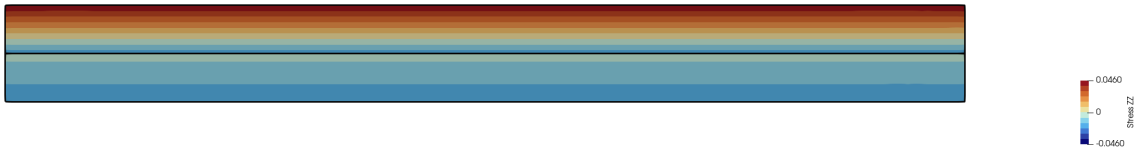
7.5.g h2p1



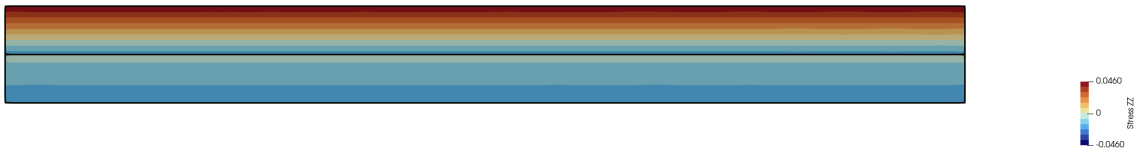
7.5.h h3p1



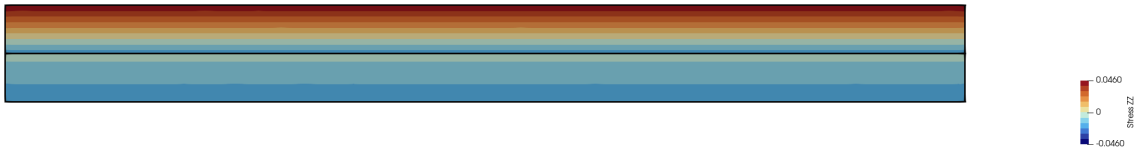
7.5.i h0p2



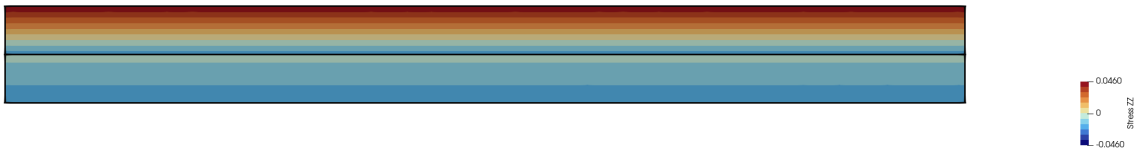
7.5.j h1p2



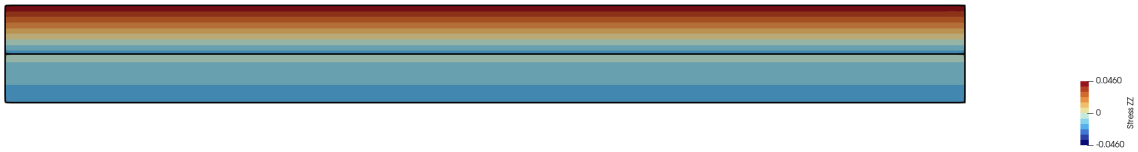
7.5.k h2p2



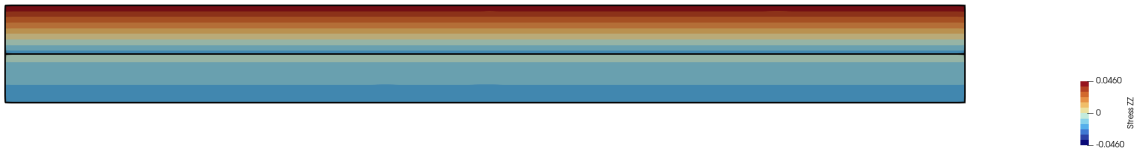
7.5.l h3p2



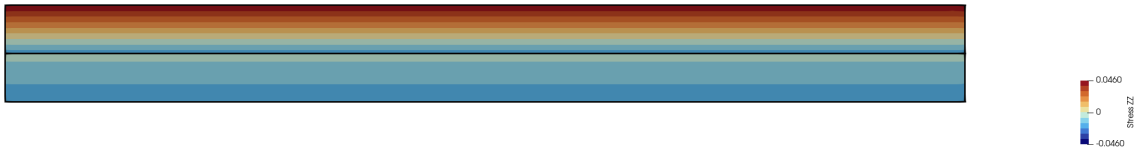
7.5.m h0p3



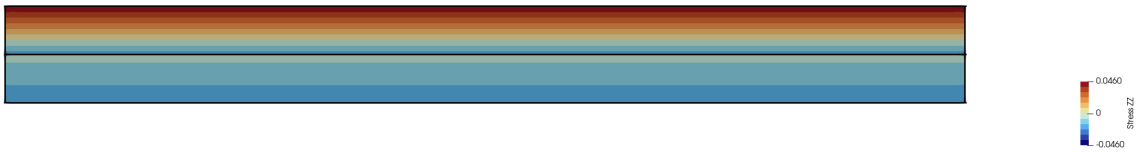
7.5.n h1p3



7.5.o h2p3



7.5.p h3p3



8 Performance

Performance is reported separately for the two stages of each immersed IGA analysis: **trimming** (building the trimmed U-spline basis on the immersing grid) and the **Abaqus solve**. Each load case uses the same mesh sweep, but timings are reported per load case because each study was executed independently.

8.1 Gravity

Coreform IGA Mesh

8.1.a $p = 1$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	195	66	24	1	3.6
5	805	630	258	2	12.7
2.5	3,311	3,690	1,026	4	39.8
1.25	17,347	24,786	4,098	8	219.5

8.1.b $p = 2$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	525	66	24	1	4.1
5	1,575	630	258	2	13.5
2.5	5,265	3,690	1,026	4	51.7
1.25	23,205	24,786	4,098	8	183.7

8.1.c $p = 3$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	1,071	66	24	1	7.3
5	2,673	630	258	2	17.6
2.5	7,755	3,690	1,026	4	55.6
1.25	30,015	24,786	4,098	8	200.8

Coreform IGA for Abaqus solve

8.1.d $p = 1$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	5,194	2,998	8,994	1	3
5	6,382	4,184	12,552	2	1
2.5	10,854	8,914	26,742	4	2
1.25	45,354	40,272	120,816	8	7

8.1.e $p = 2$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	5,224	3,329	9,987	1	3
5	6,558	4,830	14,490	2	4
2.5	10,854	10,498	31,494	4	5
1.25	46,926	46,250	138,750	8	17

8.1.f $p = 3$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	4,842	3,392	10,176	1	4
5	6,646	5,570	16,710	2	7
2.5	13,444	13,645	40,935	4	20
1.25	59,674	58,396	175,188	8	78

8.2 Body force

Coreform IGA Mesh

8.2.a $p = 1$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	195	66	24	1	4.6
5	805	630	258	2	15.4
2.5	3,311	3,690	1,026	4	50.1
1.25	17,347	24,786	4,098	8	180.8

8.2.b $p = 2$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	525	66	24	1	4.1
5	1,575	630	258	2	16.4
2.5	5,265	3,690	1,026	4	51.0
1.25	23,205	24,786	4,098	8	209.2

8.2.c $p = 3$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	1,071	66	24	1	7.5
5	2,673	630	258	2	17.8
2.5	7,755	3,690	1,026	4	55.4
1.25	30,015	24,786	4,098	8	193.9

Coreform IGA for Abaqus solve

8.2.d $p = 1$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	5,194	2,998	8,994	1	3
5	6,382	4,184	12,552	2	1
2.5	10,854	8,914	26,742	4	2
1.25	45,354	40,272	120,816	8	7

8.2.e $p = 2$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	5,224	3,329	9,987	1	2
5	6,558	4,830	14,490	2	2
2.5	10,854	10,498	31,494	4	5
1.25	46,926	46,250	138,750	8	19

8.2.f $p = 3$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	4,842	3,392	10,176	1	5
5	6,646	5,570	16,710	2	7
2.5	13,444	13,645	40,935	4	20
1.25	59,674	58,396	175,188	8	78

8.3 Pressure

Coreform IGA Mesh

8.3.a $p = 1$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	325	132	66	1	6.0
5	1,127	630	258	2	15.4
2.5	5,203	3,690	1,026	4	45.1
1.25	29,963	24,786	4,098	8	179.4

8.3.b $p = 2$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	735	132	66	1	6.4
5	2,025	630	258	2	14.7
2.5	7,605	3,690	1,026	4	54.7
1.25	37,485	24,786	4,098	8	173.3

8.3.c $p = 3$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	1,377	132	66	1	8.8
5	3,267	630	258	2	16.8
2.5	10,575	3,690	1,026	4	59.1
1.25	46,023	24,786	4,098	8	212.4

Coreform IGA for Abaqus solve

8.3.d $p = 1$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	7,884	4,537	13,611	1	2
5	9,100	5,676	17,028	2	1
2.5	14,180	10,732	32,196	4	2
1.25	54,824	45,258	135,774	8	7

8.3.e $p = 2$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	8,052	4,859	14,577	1	3

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
5	$9,364$	$6,368$	$19,104$	2	2
2.5	$14,180$	$12,314$	$36,942$	4	5
1.25	$56,972$	$51,533$	$154,599$	8	19

8.3.f $p = 3$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	$7,762$	$5,033$	$15,099$	1	5
5	$9,496$	$7,131$	$21,393$	2	9
2.5	$17,378$	$15,785$	$47,355$	4	19
1.25	$75,482$	$66,641$	$199,923$	8	77

8.4 Surface traction

Coreform IGA Mesh

8.4.a $p = 1$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	325	132	66	1	5.5
5	$1,127$	630	258	2	14.8
2.5	$5,203$	$3,690$	$1,026$	4	55.4
1.25	$29,963$	$24,786$	$4,098$	8	184.8

8.4.b $p = 2$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	735	132	66	1	6.2
5	$2,025$	630	258	2	14.5
2.5	$7,605$	$3,690$	$1,026$	4	42.7
1.25	$37,485$	$24,786$	$4,098$	8	186.4

8.4.c $p = 3$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	$1,377$	132	66	1	8.5
5	$3,267$	630	258	2	16.0

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
2.5	10,575	3,690	1,026	4	57.0
1.25	46,023	24,786	4,098	8	231.4

Coreform IGA for Abaqus solve

8.4.d $p = 1$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	5,612	3,336	10,008	1	3
5	6,698	4,412	13,236	2	1
2.5	11,366	9,254	27,762	4	3
1.25	46,982	41,250	123,750	8	7

8.4.e $p = 2$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	5,722	3,627	10,881	1	3
5	6,874	5,058	15,174	2	4
2.5	11,366	10,836	32,508	4	4
1.25	48,554	47,228	141,684	8	18

8.4.f $p = 3$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	5,560	3,862	11,586	1	5
5	6,962	5,798	17,394	2	8
2.5	13,978	14,042	42,126	4	18
1.25	62,946	60,282	180,846	8	77

8.5 End moment

Coreform IGA Mesh

8.5.a $p = 1$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	325	132	66	1	6.4
5	1,127	630	258	2	13.0

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
2.5	5,203	3,690	1,026	4	43.5
1.25	29,963	24,786	4,098	8	185.7

8.5.b $p = 2$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	735	132	66	1	6.3
5	2,025	630	258	2	15.5
2.5	7,605	3,690	1,026	4	46.8
1.25	37,485	24,786	4,098	8	208.1

8.5.c $p = 3$

h_z	Background	Active	Trimmed	CPUs	Wall-time [s]
10	1,377	132	66	1	8.9
5	3,267	630	258	2	17.4
2.5	10,575	3,690	1,026	4	55.8
1.25	46,023	24,786	4,098	8	212.8

Coreform IGA for Abaqus solve

8.5.d $p = 1$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	5,612	3,337	10,479	1	4
5	6,698	4,413	13,842	2	1
2.5	11,366	9,255	28,686	4	3
1.25	46,982	41,251	126,492	8	8

8.5.e $p = 2$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	5,722	3,628	11,349	1	4
5	6,874	5,059	15,780	2	4
2.5	11,366	10,837	33,432	4	5
1.25	48,554	47,229	144,426	8	19

8.5.f $p = 3$

h_z	Elements	Nodes	DOFs	Threads	Wall-time [s]
10	5,560	3,863	12,096	1	8
5	6,962	5,799	18,000	2	9
2.5	13,978	14,043	43,674	4	24
1.25	62,946	60,283	186,210	8	76

9 Discussion

Every load case converges under mesh refinement, with the tip deflection inside the acceptance tolerance on the finer meshes and the profile comparisons tracking the transformed-section closed forms — including the bending-stress discontinuity at the material interface, which the two-material discretization must capture without smearing. Against the transformed-section model the error plateaus: the residual is the beam theory's own modeling error (no shear deformation, and the pinned end face is stiffer than the idealized support), not a discretization error, so the line-probe convergence figures use self-convergence against the same-degree finest profiles instead of treating the closed form as truth. That the merged-part and tie-constraint interface workflows land on the same solution verifies that the tie constraint transmits the interface tractions consistently with the shared-node discretization. The gravity and body-force cases have identical pointwise force-density fields and are required to produce probe results that agree to within solver roundoff, directly verifying the translation of `GRAV` into density-weighted IGA body-force components. The pressure case belongs to the same uniformly distributed-load closed-form family but has its own independently specified magnitude.

References

[1] J. M. Gere and S. P. Timoshenko, *Mechanics of materials*, 4th ed. Boston: PWS Publishing Company, 1997.

Appendix

9.1 Capabilities exercised

The table is generated from current passing simulation and study artifacts. Each row must satisfy the linked capability card's evidence contract; declaring a capability in a test does not, by itself, create evidence.

Table 6: Capabilities exercised by the current verification artifacts.

Capability	Evidence level
Linear static analysis	Numerically validated
Static stress analysis	Numerically validated
Boundary conditions and constraints	Numerically validated
Pinned boundary condition	Numerically validated
Kinematic coupling constraints	Numerically validated
Surface tie constraints	Numerically validated
Threaded Abaqus/Standard execution	Numerically validated
Parallel Coreform IGA mesh generation	Numerically validated
Parallel execution	Numerically validated
Body-force loading	Numerically validated
Gravity loading	Numerically validated
Moment loading	Numerically validated
Pressure loading	Numerically validated
Uniform pressure loading	Numerically validated
Surface traction loading	Numerically validated
Mechanical loads	Numerically validated
Cell-based material section assignment	Numerically validated
Material density	Numerically validated
Multi-cell material interfaces	Numerically validated
Linear elastic material behavior	Numerically validated
Materials and section assignments	Numerically validated
Meshing	Numerically validated
Linear C0 spline basis	Exercised
Quadratic C1 spline basis	Numerically validated
Cubic C2 spline basis	Numerically validated
Immersed rectilinear meshes	Numerically validated
Spline basis degree and continuity	Numerically validated
Explicit field-output selection	Numerically validated
Field output requests	Numerically validated
Stress field output (S)	Exercised
Boolean [illegible] boundaries	Numerically validated

9.2 Download artifacts

Download artifacts are available from the HTML version of this page.

9.2.a Geometry CAD files

No separate CAD file is required for this problem; the geometry is fully defined in the Abaqus/CAE journal files.

9.2.b Abaqus/CAE journal files

Individual journal downloads are available from the HTML version of this page.

9.3 Supported Abaqus keywords

The decks below are reproduced from the verification tests' Abaqus input files with comments stripped and instance-specific names (sets, materials, files) redacted to `<placeholders>`.

Gravity - bimetallic_beam_bending_h0.inp outline

```
*Heading
*Preprint, echo=NO, model=NO, history=NO, contact=NO
*Include, input=<iga-mesh-inp>
*System
         0.,        -2.5,          0.,          1.,        -2.5,          0.
*System
         0.,         2.5,          0.,          1.,         2.5,          0.
*System
*Tie, name=<name>, adjust=yes, type=SURFACE TO SURFACE
flexible_interface, stiff_interface
*Material, name=<material>
*Density
 8.9e-09,
*Elastic
100000.,0.
*User Output Variables
1,
*Material, name=<material>
*Density
 1.92e-08,
*Elastic
400000.,0.
*User Output Variables
1,
*Boundary
<node-set>, PINNED
*Step, name=<step>, nlgeom=NO
*Static
1., 1., 1e-05, 1.
*Dload
<element-set>, U994, 0
<element-set>, U995, -9810
<element-set>, U996, 0
*Restart, write, frequency=0
*Output, field
*Node Output
U,
*Element Output, position=AVERAGED AT NODES, directions=YES
S,
*Output, history, variable=PRESELECT
*End Step
```

Body force - bimetallic_beam_bending_h0.inp outline

```
*Heading
*Preprint, echo=NO, model=NO, history=NO, contact=NO
*Include, input=<iga-mesh-inp>
*System
         0.,        -2.5,          0.,          1.,        -2.5,          0.
*System
         0.,         2.5,          0.,          1.,         2.5,          0.
*System
*Tie, name=<name>, adjust=yes, type=SURFACE TO SURFACE
flexible_interface, stiff_interface
*Material, name=<material>
*Density
 8.9e-09,
*Elastic
100000.,0.
*User Output Variables
1,
*Material, name=<material>
*Density
 1.92e-08,
*Elastic
400000.,0.
*User Output Variables
1,
*Boundary
<node-set>, PINNED
*Step, name=<step>, nlgeom=NO
*Static
1., 1., 1e-05, 1.
*Dload
<element-set>, U997, 0.
<element-set>, U998, -8.7309e-05
<element-set>, U999, 0.
*Dload
<element-set>, U997, 0.
<element-set>, U998, -0.000188352
<element-set>, U999, 0.
*Restart, write, frequency=0
*Output, field
*Node Output
U,
*Element Output, position=AVERAGED AT NODES, directions=YES
S,
*Output, history, variable=PRESELECT
*End Step
```

Pressure - bimetallic_beam_bending_h0.inp outline

```
*Heading
*Preprint, echo=NO, model=NO, history=NO, contact=NO
*Include, input=<iga-mesh-inp>
*System
*Material, name=<material>
*Density
 8.9e-09,
*Elastic
100000.,0.
*User Output Variables
1,
*Material, name=<material>
*Density
 1.92e-08,
*Elastic
400000.,0.
*User Output Variables
1,
*Boundary
<node-set>, PINNED
*Step, name=<step>, nlgeom=NO
*Static
1., 1., 1e-05, 1.
*Restart, write, frequency=0
*Output, field
*Node Output
U,
*Element Output, position=AVERAGED AT NODES, directions=YES
S,
*Output, history, variable=PRESELECT
*End Step
```

Surface traction - bimetallic_beam_bending_h0.inp outline

```
*Heading
*Preprint, echo=NO, model=NO, history=NO, contact=NO
*Include, input=<iga-mesh-inp>
*System
*Material, name=<material>
*Density
 8.9e-09,
*Elastic
100000.,0.
*User Output Variables
1,
*Material, name=<material>
*Density
 1.92e-08,
*Elastic
400000.,0.
*User Output Variables
1,
*Boundary
<node-set>, PINNED
*Step, name=<step>, nlgeom=NO
*Static
1., 1., 1e-05, 1.
*Restart, write, frequency=0
*Output, field
*Node Output
U,
*Element Output, position=AVERAGED AT NODES, directions=YES
S,
*Output, history, variable=PRESELECT
*End Step
```

End moment - bimetallic_beam_bending_h0.inp outline

```
*Heading
*Preprint, echo=NO, model=NO, history=NO, contact=NO
*Include, input=<iga-mesh-inp>
*System
*Node
      1,           0.,           0.,         100.
*Nset, nset=<node-set>
 1,
*Coupling,     constraint     name=moment_ref_pt_to_zmax_coupling,     ref
node=moment_ref_pt, surface=<surface>
*Kinematic
*Material, name=<material>
*Density
 8.9e-09,
*Elastic
100000.,0.
*User Output Variables
1,
*Material, name=<material>
*Density
 1.92e-08,
*Elastic
400000.,0.
*User Output Variables
1,
*Boundary
<node-set>, PINNED
*Step, name=<step>, nlgeom=NO
*Static
1., 1., 1e-05, 1.
*Cload
<node-set>, 4, 5.
*Restart, write, frequency=0
*Output, field
*Node Output
U,
*Element Output, position=AVERAGED AT NODES, directions=YES
S,
*Output, history, variable=PRESELECT
*End Step
```

9.4 Provenance

The records below identify the execution environment and verification basis for every CTest artifact reported on this page.

ℹ Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p1_body_force

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 11:26:03
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

ℹ Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p1_body_force

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 11:43:27
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p1_body_force

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 12:09:33
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p1_body_force

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:37:12
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p2_body_force

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:26:12
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p2_body_force

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:43:29
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p2_body_force

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:10:36
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p2_body_force

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:38:15
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p3_body_force

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:26:22
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p3_body_force

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:44:00
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p3_body_force

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:11:52
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p3_body_force

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:40:40
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p1_gravity

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 11:16:24
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p1_gravity

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 11:31:33
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p1_gravity

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 11:33:16
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p1_gravity

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:10:04
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p2_gravity

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:16:26
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p2_gravity

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:31:57
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p2_gravity

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:34:20
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p2_gravity

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:13:35
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p3_gravity

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:18:13
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p3_gravity

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:32:29
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p3_gravity

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:35:43
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p3_gravity

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:18:26
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p1_moment

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 11:26:29
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p1_moment

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 11:43:51
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p1_moment

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 12:11:29
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p1_moment

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:40:34
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p2_moment

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:26:39
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p2_moment

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:44:17
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p2_moment

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:12:29
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p2_moment

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:41:25
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p3_moment

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:26:53
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p3_moment

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:44:34
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p3_moment

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:13:20
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p3_moment

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:43:17
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p1_pressure

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 11:25:35
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p1_pressure

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 11:35:35
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p1_pressure

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 12:05:59
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p1_pressure

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:33:56
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

ℹ Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p2_pressure

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:25:49
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

ℹ Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p2_pressure

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:39:00
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p2_pressure

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:07:06
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p2_pressure

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:34:18
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p3_pressure

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:25:58
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p3_pressure

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:42:33
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p3_pressure

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:08:33
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p3_pressure

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:37:30
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p1_traction

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 11:18:11
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p1_traction

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 11:32:53
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p1_traction

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 11:39:49
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p1_traction

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:21:47
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

ℹ Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p1_traction_tie

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 11:24:42
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

ℹ Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p1_traction_tie

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 11:34:13
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p1_traction_tie

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 11:45:34
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p1_traction_tie

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:30:41
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p2_traction

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:23:28
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p2_traction

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:33:18
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

ℹ Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p2_traction

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:43:14
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

ℹ Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p2_traction

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:25:21
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p2_traction_tie

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:24:49
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p2_traction_tie

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:34:37
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p2_traction_tie

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:54:10
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p2_traction_tie

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:30:57
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p3_traction

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:23:33
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p3_traction

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:33:49
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p3_traction

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:44:38
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p3_traction

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:30:41
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h0p3_traction_tie

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:25:31
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_bimetallic_beam_bending_immersed_h1p3_traction_tie

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 11:35:11
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

ℹ Test_abaqus_verification_bimetallic_beam_bending_immersed_h2p3_traction_tie

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:04:34
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

ℹ Test_abaqus_verification_bimetallic_beam_bending_immersed_h3p3_traction_tie

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 12:35:57
Operating system	Ubuntu 26.04 LTS
Coreform IGA version	`2026.8-dev+tewk_1787764370`
Source revision	`bb2d69b00831`
Abaqus version	`Abaqus 6.26-4`

Test_abaqus_verification_study_bimetallic_beam_bending_gravity_body_force_equivalence

Parameter	Value
Evidence type	Numerical verification
CTest result	Passed (Release)
Verification result	Passed — 1/1 enforced criterion passed
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p1_body_force

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

i Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p1_gravity

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

i Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p1_moment

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

i Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p1_pressure

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

i Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p1_traction

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

ℹ Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p1_traction_tie

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

ℹ Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p2_body_force

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

i Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p2_gravity

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

i Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p2_moment

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

ℹ Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p2_pressure

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

ℹ Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p2_traction

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

ℹ Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p2_traction_tie

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

ℹ Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p3_body_force

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

i Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p3_gravity

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

i Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p3_moment

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

i Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p3_pressure

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (0 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

i Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p3_traction

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest

Test_abaqus_verification_study_bimetallic_beam_bending_immersed_p3_traction_tie

Parameter	Value
Evidence type	Record-only diagnostic
CTest result	Passed (Release)
Verification result	Not asserted — 1 record-only check (1 positive)
Test date	26-Aug-2026 19:29:55 UTC
Operating system	—
Coreform IGA version	Not applicable — postprocessing-only CTest
Source revision	`bb2d69b00831`
Abaqus version	Not applicable — postprocessing-only CTest