

coreform.abaqus.cf_export

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Source directory: `interop/abaqus/cf_app/coreform/abaqus/cf_export`

Directory tree

- `cf_export/`

1 export.py

Module path: `coreform.abaqus.cf_export.export`

Available API members

Name	Kind	Description
<code>export_cf</code>	Function	Write the Coreform <code>.cf</code> file for an Abaqus model.

1.1 export_cf

Object path: `coreform.abaqus.cf_export.export.export_cf`

Description: Write the Coreform `.cf` file for an Abaqus model.

Call syntax

```
result = coreform.abaqus.cf_export.export.export_cf(mdb_object=mdb_object,
model_name=model_name, cf_path=cf_path)
```

Returns

Type	Description
<code>str</code>	The supplied destination path after the file has been written.

Signatures

```
export_cf(mdb_object: object, model_name: str, cf_path: str, probe_specs:
Optional[Sequence[object]] = None, part_metadata: Optional[Mapping[str,
Mapping[str, object]]] = None) -> str
```

Parameters

Name	Type	Required	Default	Description
<code>mdb_object</code>	<code>object</code>	Yes	—	Abaqus model database containing the model to export.
<code>model_name</code>	<code>str</code>	Yes	—	Name of the Abaqus model to export.
<code>cf_path</code>	<code>str</code>	Yes	—	Destination path for the Coreform <code>.cf</code> file.
<code>probe_specs</code>	<code>Optional[Sequence[object]]</code>	No	None	Probe specifications to serialize. When omitted, collect them from the model's persistent Probe repository.
<code>part_metadata</code>	<code>Optional[Mapping[str, Mapping[str, object]]]</code>	No	None	Per-part material and locking-free over-

Name	Type	Required	Default	Description
				rides keyed by instance or partname.

2 locking_free_configuration.py

Module path: `coreform.abaqus.cf_export.locking_free_configuration`

Available API members

Name	Kind	Description
<code>CutCellPressureTreatment.NOM</code>	Attribute	Do not apply a special cut-cell pressure treatment.
<code>CutCellPressureTreatment.PRESSURE_AGGREGATION</code>	Attribute	Aggregate cut-cell pressure degrees of freedom.
<code>LockingFreeStabilization.NOM</code>	Attribute	Do not add stabilization.
<code>LockingFreeStabilization.VMS</code>	Attribute	Apply variational multi-scale stabilization.
<code>locking_free_parameters</code>	Function	Build a complete composable locking-free configuration.
<code>has_explicit_pressure_dofs</code>	Function	Return whether a configuration retains explicit pressure degrees of freedom.
<code>locking_free_part_metadata</code>	Function	Build material metadata for a locking-free Part.
<code>requires_unsymmetric_matrix</code>	Function	Return whether the locking-free tangent must retain unsymmetric blocks.
<code>CutCellPressureTreatment</code>	Class	Select how pressure degrees of freedom are treated in cut cells.
<code>LockingFreeStabilization</code>	Class	Select the stabilization used by a locking-free formulation.

2.1 CutCellPressureTreatment

Object

path:

`coreform.abaqus.cf_export.locking_free_configuration.CutCellPressureTreatment`

Select how pressure degrees of freedom are treated in cut cells.

2.1.a Attributes

Name	Type	Value	Description
NONE	CutCellPressureTreatment	<code>'none'</code>	Do not apply a special cut-cell pressure treatment.
PRESSURE_AGGREGATION	CutCellPressureTreatment	<code>'pressure_aggregation'</code>	Aggregate cut-cell pressure degrees of freedom.

2.2 LockingFreeStabilization

Object

path:

`coreform.abaqus.cf_export.locking_free_configuration.LockingFreeStabilization`

Select the stabilization used by a locking-free formulation.

2.2.a Attributes

Name	Type	Value	Description
NONE	LockingFreeStabilization	<code>'none'</code>	Do not add stabilization.
VMS	LockingFreeStabilization	<code>'vms'</code>	Apply variational multiscale stabilization.

2.3 locking_free_parameters

Object

path:

`coreform.abaqus.cf_export.locking_free_configuration.locking_free_parameters`

Description: Build a complete composable locking-free configuration.

Call syntax

```
result = coreform.abaqus.cf_export.locking_free_configuration.locking_free_parameters(displacement)
```

Returns

Type	Description
<code>dict</code>	Metadata for a condensed $U(p, C^{(p-2)})/P0$ configuration by default.

Signatures

```
locking_free_parameters(displacement_degree: int, displacement_continuity:
Optional[int] = None, pressure_degree: int = 0, pressure_continuity:
int = -1, macro_elements: bool = False, static_condensation:
bool = True, cut_cell_pressure_treatment: Union[CutCellPressureTreatment,
str] = CutCellPressureTreatment.PRESSURE_AGGREGATION, stabilization:
Union[LockingFreeStabilization, str] = LockingFreeStabilization.NONE) ->
dict[str, object]
```

Parameters

Name	Type	Required	Default	Description
<code>displacement_degree</code>	<code>int</code>	Yes	—	Polynomial degree of the displacement basis.
<code>displacement_continuity</code>	<code>Optional[int]</code>	No	None	Displacement continuity, or None to use degree - 2.
<code>pressure_degree</code>	<code>int</code>	No	0	Polynomial degree of the pressure basis.
<code>pressure_continuity</code>	<code>int</code>	No	-1	Continuity of the pressure basis.
<code>macro_elements</code>	<code>bool</code>	No	False	Whether to use macro-element stabilization.
<code>static_condensation</code>	<code>bool</code>	No	True	Whether to statically condense pres-

Name	Type	Required	Default	Description
				sure degrees of freedom.
<code>cut_cell_pressure_treatment</code>	<code>Union[CutCellPressureTreatment, str]</code>	No	<code>CutCellPressureTreatment.PRESSURE_AGGREGATION</code>	Pressure treatment applied to cut cells.
<code>stabilization</code>	<code>Union[LockingFreeStabilization, str]</code>	No	<code>LockingFreeStabilization.NONE</code>	Stabilization applied to the formulation.

2.4 `has_explicit_pressure_dofs`

Object

path:

`coreform.abaqus.cf_export.locking_free_configuration.has_explicit_pressure_dofs`

Description: Return whether a configuration retains explicit pressure degrees of freedom.

Call syntax

```
result = coreform.abaqus.cf_export.locking_free_configuration.has_explicit_pressure_dofs(params=pa
```

Returns

Type	Description
<code>bool</code>	Return whether a configuration retains explicit pressure degrees of freedom.

Signatures

```
has_explicit_pressure_dofs(params: Mapping[str, object]) -> bool
```

Parameters

Name	Type	Required	Default	Description
<code>params</code>	<code>Mapping[str, object]</code>	Yes	—	Locking-free configuration metadata.

2.5 locking_free_part_metadata

Object

path:

coreform.abaqus.cf_export.locking_free_configuration.locking_free_part_metadata

Description: Build material metadata for a locking-free Part.

Call syntax

```
result = coreform.abaqus.cf_export.locking_free_configuration.locking_free_part_metadata(params=params,
use_locking_free=use_locking_free,
youngs_modulus=youngs_modulus, poissons_ratio=poissons_ratio)
```

Returns

Type	Description
dict	Complete exporter metadata for the Part material and formulation.

Signatures

```
locking_free_part_metadata(params: Mapping[str, object], use_locking_free:
bool, youngs_modulus: float, poissons_ratio: float) -> dict[str, object]
```

Parameters

Name	Type	Required	Default	Description
params	Mapping[str, object]	Yes	—	Composable locking-free configuration and optional material settings.
use_locking_free	bool	Yes	—	Whether the Part uses the locking-free formulation.
youngs_modulus	float	Yes	—	Young's modulus assigned to the Part material.

Name	Type	Required	Default	Description
<code>poissons_ratio</code>	<code>float</code>	Yes	—	Poisson's ratio assigned to the Part material.

2.6 `requires_unsymmetric_matrix_storage`

Object path: `coreform.abaqus.cf_export.locking_free_configuration.requires_unsymmetric_matrix_storage`

Description: Return whether the locking-free tangent must retain unsymmetric blocks.

Call syntax

```
result = coreform.abaqus.cf_export.locking_free_configuration.requires_unsymmetric_matrix_storage()
```

Returns

Type	Description
<code>bool</code>	Return whether the locking-free tangent must retain unsymmetric blocks.

Signatures

```
requires_unsymmetric_matrix_storage(params: Mapping[str, object]) -> bool
```

Parameters

Name	Type	Required	Default	Description
<code>params</code>	<code>Mapping[str, object]</code>	Yes	—	Locking-free configuration metadata.