CGNS Additions for FSI with deformable boundaries

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GridLocation_t := Enumeration(
Null,
Vertex,
CellCenter,
FaceCenter,
IFaceCenter,
JFaceCenter,
KFaceCenter,
EdgeCenter,
GaussPts,
UserDefined) ;

BCTypeSimple_t := Enumeration(
Null, BCGeneral, BCDirichlet, BCNeumann, BCExtrapolate, BCWallInviscid,
BCWallViscousHeatFlux, BCWallViscousIsothermal, BCWallViscous, BCWall,
BCInflowSubsonic, BCInflowSupersonic, BCOutflowSubsonic, BCOutflowSupersonic,
BCTunnelInflow, BCTunnelOutflow, BCDegenerateLine, BCDegeneratePoint,
BCSymmetryPlane, BCSymmetryPolar, BCAxisymmetricWedge, FamilySpecified,
BCDisplacement, **BCRotation**, **BCVelocity**, **BCAcceleration**, UserDefined) ;

BCTypeCompound_t := Enumeration(
Null, BCInflow, BCOutflow, BCFarfield, **BCFluidStructure**, UserDefined) ;

GoverningEquationsType_t := Enumeration(
Null,
FullPotential,
Euler,
NSLaminar,
NSTurbulent,
NSLaminarIncompressible,
NSTurbulentIncompressible,
LinearStrain,
NonLinearStrain,
UserDefined);

ConsitutiveModel Structure Defnition: ConstitutiveModel_t

ConsitutiveModel_t describes the equation set used to model deformation quantities.
ConsitutiveModelType_t := Enumeration(
Null,
Elastic,
Hyperelastic,
QuasiLinearViscoelastic,
Viscoelastic,
UserDefined) ;

For example:

HyperelasticModel

$$\sigma = J^{-1}\frac{\partial \psi(\mathbf{F})}{\partial \mathbf{F}}\mathbf{F}^{\mathrm{T}}$$

Appendix Solidfield Solution

Displacement variables

DISPLACEMENT	(Vertex)
DISPLACEMENT_MAGNITUDE	(Vertex)
ROTATION	(Vertex)

Velocity variables

ANGULAR_VELOCITY	(Vertex)
ELEMENT_VELOCITY	(Cell)
VELOCITY	(Vertex)
VELOCITY_MAGNITUDE	(Vertex)

Acceleration variables

ACCELERATION	(Vertex)
ACCELERATION_MAGNITUDE	(Vertex)
ANGULAR_ACCELERATION	(Vertex)

Temperature variables

ELEMENT_TEMPERATURE	(Cell)
TEMPERATURE	(Vertex)

Stress variables

DISTORTIONAL_STRESS	(Cell)
EFFECTIVE_STRESS	(Cell)
MAX_SHEAR_STRESS	(Cell)
PRESSURE	(Cell)
NODAL_PRESSURE	(Cell)
CAUCHY_STRESS	(Cell)
2ND_PIOLA_KIRRCHOFF_STRESS	(Cell)

Strain variables

DEFORMATION_GRADIENT	(Cell)
GREENS_STRAIN	(Cell)
ALMANSI_STRAIN	(Cell)
LOGSTRAIN	(Cell)
SHEAR_STRAIN	(Cell)
STRETCH	(Cell)
THERMAL_STRAIN	(Cell)
VOLUMETRIC_STRAIN	(Cell)