

## API

just so we know what types of argument is being pass, what is being returned, whether it is private/public so we can test it more efficiently.

### Acceleration

```

F MPS2_PER_KMPS2 : double
F MPS2_PER_FPS2 : double
F MPS2_PER_KYPS2 : double
F MPS2_PER_DMPS2 : double
F MPS2_PER_MIPS2 : double
F MPS2_PER_NMPS2 : double
F KMPS2_PER_MPS2 : double
F FPS2_PER_MPS2 : double
F KYPS2_PER_MPS2 : double
F DMPS2_PER_MPS2 : double
F MIPS2_PER_MPS2 : double
F NMPS2_PER_MPS2 : double
C Acceleration()
C Acceleration(GenericScalar<Acceleration>)
C Acceleration(Acceleration)
  setInMetersPerSecondPerSecond(double) : Acceleration
  setInKilometersPerSecondPerSecond(double) : Acceleration
  setInFeetPerSecondPerSecond(double) : Acceleration
  setInKiloyardsPerSecondPerSecond(double) : Acceleration
  setInDataMilesPerSecondPerSecond(double) : Acceleration
  setInStatuteMilesPerSecondPerSecond(double) : Acceleration
  setInNauticalMilesPerSecondPerSecond(double) : Acceleration
  getInMetersPerSecondPerSecond() : double
  getInKilometersPerSecondPerSecond() : double
  getInFeetPerSecondPerSecond() : double
  getInKiloyardsPerSecondPerSecond() : double
  getInDataMilesPerSecondPerSecond() : double
  getInStatuteMilesPerSecondPerSecond() : double
  getInNauticalMilesPerSecondPerSecond() : double
S getMPS2_PER_KMPS2() : double
S getMPS2_PER_FPS2() : double
S getMPS2_PER_KYPS2() : double
S getMPS2_PER_DMPS2() : double
S getMPS2_PER_MIPS2() : double
S getMPS2_PER_NMPS2() : double
S getKMPS2_PER_MPS2() : double
S getFPS2_PER_MPS2() : double
S getKYPS2_PER_MPS2() : double
S getDMPS2_PER_MPS2() : double
S getMIPS2_PER_MPS2() : double
S getNMPS2_PER_MPS2() : double
  getDefaultUnits() : String
  ScalarTypeConstructorSurrogate(GenericScalar<Acceleration>) : Acceleration
  getScalarName() : String
S zero() : Acceleration
```

## AccelerationFlux

- <sup>C</sup> AccelerationFlux()
- <sup>C</sup> AccelerationFlux(GenericScalar<AccelerationFlux>)
- setInMetersCubedPerSecondPerSecond(double) : AccelerationFlux
- getInMetersCubedPerSecondPerSecond() : double
- <sup>△</sup> getDefaultUnits() : String
- <sup>◇</sup> <sup>△</sup> ScalarTypeConstructorSurrogate(GenericScalar<AccelerationFlux>) : AccelerationFlux
- <sup>◇</sup> <sup>△</sup> getScalarName() : String
- <sup>S</sup> zero() : AccelerationFlux

## AccelerationVector

- <sup>C</sup> AccelerationVector()
- <sup>C</sup> AccelerationVector(GenericVector<Acceleration, AccelerationVector>)
- <sup>△</sup> <sup>C</sup> AccelerationVector(GenericVector<Acceleration, AccelerationVector>, BaseCartesianCoordinateSystem3D)
- <sup>△</sup> <sup>C</sup> AccelerationVector(Acceleration, Acceleration, Acceleration, BaseCartesianCoordinateSystem3D)
- <sup>△</sup> VectorTypeConstructorSurrogate(GenericVector<Acceleration, AccelerationVector>) : AccelerationVector
- <sup>◇</sup> <sup>F</sup> <sup>△</sup> getVectorName() : String

## AngularAcceleration

- <sup>△</sup> <sup>S</sup> <sup>F</sup> RPS2\_PER\_DPS2 : double
- <sup>△</sup> <sup>S</sup> <sup>F</sup> DPS2\_PER\_RPS2 : double
- <sup>C</sup> AngularAcceleration()
- <sup>C</sup> AngularAcceleration(GenericScalar<AngularAcceleration>)
- <sup>C</sup> AngularAcceleration(AngularAcceleration)
- setInRadiansPerSecondPerSecond(double) : AngularAcceleration
- setInDegreesPerSecondPerSecond(double) : AngularAcceleration
- getInRadiansPerSecondPerSecond() : double
- getInDegreesPerSecondPerSecond() : double
- <sup>◇</sup> <sup>S</sup> getRPS2\_PER\_DPS2() : double
- <sup>◇</sup> <sup>S</sup> getDPS2\_PER\_RPS2() : double
- <sup>△</sup> getDefaultUnits() : String
- <sup>◇</sup> <sup>△</sup> ScalarTypeConstructorSurrogate(GenericScalar<AngularAcceleration>) : AngularAcceleration
- <sup>◇</sup> <sup>△</sup> getScalarName() : String
- <sup>S</sup> zero() : AngularAcceleration

## AngularLength

- ⌘<sup>S</sup> F RADIANS\_PER\_REVOLUTION : double
- ⌘<sup>S</sup> F RADIANS\_PER\_DEGREE : double
- ⌘<sup>S</sup> F DEGREES\_PER\_MINUTE : double
- ⌘<sup>S</sup> F MINUTES\_PER\_SECOND : double
- ⌘<sup>S</sup> F RADIANS\_PER\_HOUR : double
- ⌘<sup>S</sup> F HOURS\_PER\_MINUTE : double
- ⌘<sup>S</sup> F REVOLUTIONS\_PER\_RADIAN : double
- ⌘<sup>S</sup> F DEGREES\_PER\_RADIAN : double
- ⌘<sup>S</sup> F MINUTES\_PER\_DEGREE : double
- ⌘<sup>S</sup> F SECONDS\_PER\_MINUTE : double
- ⌘<sup>S</sup> F HOURS\_PER\_RADIAN : double
- ⌘<sup>S</sup> F MINUTES\_PER\_HOUR : double
- ⌘<sup>S</sup> F PI : double
- ⌘<sup>S</sup> F TWO\_PI : double
- ⌘<sup>S</sup> F PI\_OVER\_TWO : double
- <sup>C</sup> AngularLength()
- <sup>C</sup> AngularLength(GenericScalar<AngularLength>)
- <sup>C</sup> AngularLength(AngularLength)
- setInRadians(double) : AngularLength
- setInRevolutions(double) : AngularLength
- setInDegrees(double) : AngularLength
- setInDMS(int, int, double) : AngularLength
- setInHMS(int, int, double) : AngularLength
- getInRadians() : double
- getInRevolutions() : double
- getInDegrees() : double
- ⌘<sup>S</sup> getInDMS(Reference<Integer>, Reference<Integer>, Reference<Double>) : void
- ⌘<sup>S</sup> getInHMS(Reference<Integer>, Reference<Integer>, Reference<Double>) : void
- restricted() : AngularLength
- <sup>S</sup> pi() : AngularLength
- <sup>S</sup> twoPi() : AngularLength
- <sup>S</sup> piOverTwo() : AngularLength
- ◆<sup>S</sup> getPI() : double
- ◆<sup>S</sup> getTWO\_PI() : double
- ◆<sup>S</sup> getPI\_OVER\_TWO() : double
- ◆<sup>S</sup> getRADIANS\_PER\_REVOLUTION() : double
- ◆<sup>S</sup> getRADIANS\_PER\_DEGREE() : double
- ◆<sup>S</sup> getDEGREES\_PER\_RADIAN() : double
- ◆<sup>S</sup> getMINUTES\_PER\_DEGREE() : double
- ◆<sup>S</sup> getSECONDS\_PER\_MINUTE() : double
- ◆<sup>S</sup> getDEGREES\_PER\_MINUTE() : double
- ◆<sup>S</sup> getMINUTES\_PER\_SECOND() : double
- ◆<sup>S</sup> getREVOLUTIONS\_PER\_RADIAN() : double
- ◆<sup>S</sup> getRADIANS\_PER\_HOUR() : double
- ◆<sup>S</sup> getHOURS\_PER\_RADIAN() : double
- ◆<sup>S</sup> getMINUTES\_PER\_HOUR() : double
- ◆<sup>S</sup> getHOURS\_PER\_MINUTE() : double
- ◆<sup>△</sup> ScalarTypeConstructorSurrogate(GenericScalar<AngularLength>) : AngularLength
- ◆<sup>△</sup> getDefaultUnits() : String
- ◆<sup>△</sup> getScalarName() : String
- <sup>S</sup> zero() : AngularLength

## AngularSpeed

- ⚡ <sup>F</sup> RADIANS\_PER\_SECOND\_PER\_DEGREE\_PER\_SECOND : double
- ⚡ <sup>F</sup> RADIANS\_PER\_SECOND\_PER\_DEGREE\_PER\_MINUTE : double
- ⚡ <sup>F</sup> RADIANS\_PER\_SECOND\_PER\_REVOLUTION\_PER\_MINUTE : double
- ⚡ <sup>F</sup> DEGREES\_PER\_SECOND\_PER\_RADIAN\_PER\_SECOND : double
- ⚡ <sup>F</sup> DEGREES\_PER\_MINUTE\_PER\_RADIAN\_PER\_SECOND : double
- ⚡ <sup>F</sup> REVOLUTIONS\_PER\_MINUTE\_PER\_RADIAN\_PER\_SECOND : double
- <sup>C</sup> AngularSpeed()
- <sup>C</sup> AngularSpeed(GenericScalar<AngularSpeed>)
- <sup>C</sup> AngularSpeed(AngularSpeed)
- setInRadiansPerSecond(double) : AngularSpeed
- setInDegreesPerSecond(double) : AngularSpeed
- setInDegreesPerMinute(double) : AngularSpeed
- setInRevolutionsPerMinute(double) : AngularSpeed
- getInRadiansPerSecond() : double
- getInDegreesPerSecond() : double
- getInDegreesPerMinute() : double
- getInRevolutionsPerMinute() : double
- ◆ <sup>S</sup> getRADIANS\_PER\_SECOND\_PER\_DEGREE\_PER\_SECOND() : double
- ◆ <sup>S</sup> getRADIANS\_PER\_SECOND\_PER\_DEGREE\_PER\_MINUTE() : double
- ◆ <sup>S</sup> getRADIANS\_PER\_SECOND\_PER\_REVOLUTION\_PER\_MINUTE() : double
- ◆ <sup>S</sup> getDEGREES\_PER\_SECOND\_PER\_RADIAN\_PER\_SECOND() : double
- ◆ <sup>S</sup> getDEGREES\_PER\_MINUTE\_PER\_RADIAN\_PER\_SECOND() : double
- ◆ <sup>S</sup> getREVOLUTIONS\_PER\_MINUTE\_PER\_RADIAN\_PER\_SECOND() : double
- <sup>△</sup> getDefaultUnits() : String
- ◆ <sup>△</sup> ScalarTypeConstructorSurrogate(GenericScalar<AngularSpeed>) : AngularSpeed
- ◆ <sup>△</sup> getScalarName() : String
- <sup>S</sup> zero() : AngularSpeed

## AngularVelocityVector

- <sup>C</sup> AngularVelocityVector()
- <sup>C</sup> AngularVelocityVector(GenericVector<AngularSpeed, AngularVelocityVector>)
- <sup>C</sup> AngularVelocityVector(GenericVector<AngularSpeed, AngularVelocityVector>, BaseCartesianCoordinateSystem3D)
- <sup>C</sup> AngularVelocityVector(AngularSpeed, AngularSpeed, AngularSpeed, BaseCartesianCoordinateSystem3D)
- <sup>△</sup> VectorTypeConstructorSurrogate(GenericVector<AngularSpeed, AngularVelocityVector>) : AngularVelocityVector
- ◆ <sup>F</sup> <sup>△</sup> getVectorName() : String

















## Area

- <sup>C</sup> Area()
- <sup>C</sup> Area(GenericScalar<Area>)
- <sup>C</sup> Area(Area)
- setInMetersSquared(double) : Area
- setInCentimetersSquared(double) : Area
- setInKilometersSquared(double) : Area
- setInFeetSquared(double) : Area
- setInYardsSquared(double) : Area
- setInKiloyardsSquared(double) : Area
- setInDataMilesSquared(double) : Area
- setInStatuteMilesSquared(double) : Area
- setInNauticalMilesSquared(double) : Area
- setInAcres(double) : Area
- setInHectares(double) : Area
- getInMetersSquared() : double
- getInCentimetersSquared() : double
- getInKilometersSquared() : double
- getInFeetSquared() : double
- getInYardsSquared() : double
- getInKiloyardsSquared() : double
- getInDataMilesSquared() : double
- getInStatuteMilesSquared() : double
- getInNauticalMilesSquared() : double
- getInAcres() : double
- getInHectares() : double
- ◆ <sup>S</sup> getFEET\_SQ\_PER\_ACRE() : double
- ◆ <sup>S</sup> getMETERS\_SQ\_PER\_HECTARE() : double
- ◆ <sup>S</sup> getMETERS\_SQ\_PER\_CENTIMETER\_SQ() : double
- ◆ <sup>S</sup> getMETERS\_SQ\_PER\_KILOMETER\_SQ() : double
- ◆ <sup>S</sup> getMETERS\_SQ\_PER\_FOOT\_SQ() : double
- ◆ <sup>S</sup> getMETERS\_SQ\_PER\_YARD\_SQ() : double
- ◆ <sup>S</sup> getMETERS\_SQ\_PER\_KILOYARD\_SQ() : double
- ◆ <sup>S</sup> getMETERS\_SQ\_PER\_DATA\_MILE\_SQ() : double
- ◆ <sup>S</sup> getMETERS\_SQ\_PER\_STATUTE\_MILE\_SQ() : double
- ◆ <sup>S</sup> getMETERS\_SQ\_PER\_NAUTICAL\_MILE\_SQ() : double
- ◆ <sup>S</sup> getMETERS\_SQ\_PER\_ACRE() : double
- ◆ <sup>S</sup> getCENTIMETERS\_SQ\_PER\_METER\_SQ() : double
- ◆ <sup>S</sup> getKILOMETERS\_SQ\_PER\_METER\_SQ() : double
- ◆ <sup>S</sup> getFEET\_SQ\_PER\_METER\_SQ() : double
- ◆ <sup>S</sup> getYARDS\_SQ\_PER\_METER\_SQ() : double
- ◆ <sup>S</sup> getKILOYARDS\_SQ\_PER\_METER\_SQ() : double
- ◆ <sup>S</sup> getDATA\_MILES\_SQ\_PER\_METER\_SQ() : double
- ◆ <sup>S</sup> getSTATUTE\_MILES\_SQ\_PER\_METER\_SQ() : double
- ◆ <sup>S</sup> getNAUTICAL\_MILES\_SQ\_PER\_METER\_SQ() : double
- ◆ <sup>S</sup> getACRES\_PER\_METER\_SQ() : double
- ◆ <sup>S</sup> getHECTARES\_PER\_METER\_SQ() : double
- <sup>△</sup> getDefaultUnits() : String
- ◆ <sup>△</sup> ScalarTypeConstructorSurrogate(GenericScalar<Area>) : Area
- ◆ <sup>△</sup> getScalarName() : String
- <sup>S</sup> zero() : Area













## BaseCartesianCoordinateSystem3D

## CoordinateSystem3D

















### ECRAccelerationVector

-   zero : ECRAccelerationVector
-   ECRAccelerationVector()
-   ECRAccelerationVector(Acceleration, Acceleration, Acceleration)
-   ECRAccelerationVector(ECRAccelerationVector)
-   ECRAccelerationVector(AccelerationVector)
-   getZeroVector() : ECRAccelerationVector
-   opAssign(ECRAccelerationVector) : ECRAccelerationVector
-   opEq(ECRAccelerationVector) : boolean





















### ECRAngularVelocityVector

-   zero : ECRAngularVelocityVector
-   ECRAngularVelocityVector()
-   ECRAngularVelocityVector(AngularSpeed, AngularSpeed, AngularSpeed)
-   ECRAngularVelocityVector(ECRAngularVelocityVector)
-   ECRAngularVelocityVector(AngularVelocityVector)
-   getZeroVector() : ECRAngularVelocityVector
















### ECRCoords

-   oneAndOnly : ECRCoords
-   getCoords() : ECRCoords
-   ECRCoords(ECRCoords)
-   clone() : BaseCartesianCoordinateSystem3D
-   convertPositionToECR(PositionVector, Time) : PositionVector
-   convertPositionFromECR(PositionVector, Time) : PositionVector
-   convertVelocityToECR(VelocityVector, Time, PositionVector) : VelocityVector
-   convertVelocityFromECR(VelocityVector, Time, PositionVector) : VelocityVector
-   convertAccelerationToECR(AccelerationVector, Time, PositionVector, VelocityVector) : AccelerationVector
-   convertAccelerationFromECR(AccelerationVector, Time, PositionVector, VelocityVector) : AccelerationVector
-   ECRCoords()
-   AccelerationVectorConstructorSurrogate(AccelerationVector) : ECRAccelerationVector
-   AngularVelocityVectorConstructorSurrogate(AngularVelocityVector) : ECRAngularVelocityVector
-   PositionVectorConstructorSurrogate(PositionVector) : ECRPositionVector
-   VelocityVectorConstructorSurrogate(VelocityVector) : ECRVelocityVector
-   getCoordinateSystemName() : String

## ECRPositionVector

-   `zero : ECRPositionVector`
-   `ECRPositionVector()`
-   `ECRPositionVector(Length, Length, Length)`
-   `ECRPositionVector(ECRPositionVector)`
-   `ECRPositionVector(PositionVector)`
-   `getZeroVector() : ECRPositionVector`
-   `getScaled(Length) : ECRPositionVector`
-   `opAssign(ECRPositionVector) : ECRPositionVector`
-  `opEq(ECRPositionVector) : boolean`
-  `opCompare(ECRPositionVector) : int`
-   `compareTo(ECRPositionVector) : int`

## ECRVelocityVector

-   `zero : ECRVelocityVector`
-   `ECRVelocityVector()`
-   `ECRVelocityVector(Speed, Speed, Speed)`
-   `ECRVelocityVector(ECRVelocityVector)`
-   `ECRVelocityVector(VelocityVector)`
-   `getZeroVector() : ECRVelocityVector`
-   `opAssign(ECRVelocityVector) : ECRVelocityVector`
-  `opEq(ECRVelocityVector) : boolean`

## Frequency

-  `HERTZ_PER_KILOHERTZ` : double
-  `HERTZ_PER_MEGAHERTZ` : double
-  `HERTZ_PER_GIGAHERTZ` : double
-  `INVERSE_SIDEREAL_SECONDS_PER_HERTZ` : double
-  `HERTZ_PER_INVERSE_SIDEREAL_SECOND` : double
-  `INVERSE_CALENDAR_DAYS_PER_HERTZ` : double
-  `HERTZ_PER_INVERSE_CALENDAR_DAY` : double
-  `INVERSE_MEAN_SOLAR_DAYS_PER_HERTZ` : double
-  `HERTZ_PER_INVERSE_MEAN_SOLAR_DAY` : double
-  `INVERSE_SIDEREAL_DAYS_PER_HERTZ` : double
-  `HERTZ_PER_INVERSE_SIDEREAL_DAY` : double
-  `KILOHERTZ_PER_HERTZ` : double
-  `MEGAHERTZ_PER_HERTZ` : double
-  `GIGAHERTZ_PER_HERTZ` : double
-  `Frequency()`
-  `Frequency(Frequency)`
-  `Frequency(GenericScalar<Frequency>)`
-  `setInHertz(double)` : Frequency
-  `setInKiloHertz(double)` : Frequency
-  `setInMegaHertz(double)` : Frequency
-  `setInGigaHertz(double)` : Frequency
-  `setInInverseSiderealSeconds(double)` : Frequency
-  `setInInverseCalendarDays(double)` : Frequency
-  `setInInverseMeanSolarDays(double)` : Frequency
-  `setInInverseSiderealDays(double)` : Frequency
-  `getInHertz()` : double
-  `getInKiloHertz()` : double
-  `getInMegaHertz()` : double
-  `getInGigaHertz()` : double
-  `getInInverseSiderealSeconds()` : double
-  `getInInverseCalendarDays()` : double
-  `getInInverseMeanSolarDays()` : double
-  `getInInverseSiderealDays()` : double
-  `getHERTZ_PER_KILOHERTZ()` : double
-  `getHERTZ_PER_MEGAHERTZ()` : double
-  `getHERTZ_PER_GIGAHERTZ()` : double
-  `getINVERSE_SIDEREAL_SECONDS_PER_HERTZ()` : double
-  `getHERTZ_PER_INVERSE_SIDEREAL_SECOND()` : double
-  `getINVERSE_CALENDAR_DAYS_PER_HERTZ()` : double
-  `getHERTZ_PER_INVERSE_CALENDAR_DAY()` : double
-  `getINVERSE_MEAN_SOLAR_DAYS_PER_HERTZ()` : double
-  `getHERTZ_PER_INVERSE_MEAN_SOLAR_DAY()` : double
-  `getINVERSE_SIDEREAL_DAYS_PER_HERTZ()` : double
-  `getHERTZ_PER_INVERSE_SIDEREAL_DAY()` : double
-  `getKILOHERTZ_PER_HERTZ()` : double
-  `getMEGAHERTZ_PER_HERTZ()` : double
-  `getGIGAHERTZ_PER_HERTZ()` : double
-  `getDefaultUnits()` : String
-  `ScalarTypeConstructorSurrogate(GenericScalar<Frequency>)` : Frequency
-  `getScalarName()` : String
-  `zero()` : Frequency



## FrequencySquared

- FrequencySquared()
- FrequencySquared(FrequencySquared)
- FrequencySquared(GenericScalar<FrequencySquared>)
- setInHertzSquared(double) : FrequencySquared
- getInHertzSquared() : double
- getDefaultUnits() : String
- ScalarTypeConstructorSurrogate(GenericScalar<FrequencySquared>) : FrequencySquared
- getScalarName() : String
- zero() : FrequencySquared

## GenericPoint

- XMLClassName : String
- x1 : Scalar1T
- x2 : Scalar2T
- x3 : Scalar3T
- GenericPoint()
- GenericPoint(GenericPoint<Scalar1T, Scalar2T, Scalar3T, CoordT>)
- GenericPoint(GenericPoint<Scalar1T, Scalar2T, Scalar3T, CoordT>, CoordT)
- opAssign(GenericPoint<Scalar1T, Scalar2T, Scalar3T, CoordT>) : GenericPoint<Scalar1T, Scalar2T, Scalar3T, CoordT>
- opEq(GenericPoint<Scalar1T, Scalar2T, Scalar3T, CoordT>) : boolean
- opNotEq(GenericPoint<Scalar1T, Scalar2T, Scalar3T, CoordT>) : boolean
- toString() : String
- writeObject(byte[], int) : int
- readObject(byte[], int) : int
- GenericPoint(Scalar1T, Scalar2T, Scalar3T, CoordT)
- getX1() : Scalar1T
- getX2() : Scalar2T
- getX3() : Scalar3T
- getX1X2X3(Scalar1T, Scalar2T, Scalar3T) : void
- calculateWriteSize() : int
- fromXMLNode(Node) : boolean
- fromXMLString(String) : boolean
- toXMLString() : String










## GenericScalar

- ❑ value : double
- ❑ setFlag : boolean
- <sup>C</sup> GenericScalar(GenericScalar<ScalarType>)
- opZeroAssign() : ScalarType
- opZero() : ScalarType
- opCopy() : ScalarType
- <sup>F</sup> opAssign(ScalarType) : ScalarType
- <sup>F</sup> opAdd(ScalarType) : ScalarType
- <sup>F</sup> opSub(ScalarType) : ScalarType
- <sup>F</sup> opNeg() : ScalarType
- <sup>F</sup> opNegAssign() : ScalarType
- <sup>F</sup> opAddAssign(ScalarType) : ScalarType
- <sup>F</sup> opSubAssign(ScalarType) : ScalarType
- <sup>F</sup> opMult(double) : ScalarType
- <sup>F</sup> opMultAssign(double) : ScalarType
- <sup>F</sup> opDiv(ScalarType) : double
- <sup>F</sup> opDiv(double) : ScalarType
- <sup>F</sup> opDivAssign(double) : ScalarType
- <sup>F</sup> opEq(ScalarType) : boolean
- <sup>F</sup> opNotEq(ScalarType) : boolean
- <sup>F</sup> opLessEq(ScalarType) : boolean
- <sup>F</sup> opLess(ScalarType) : boolean
- <sup>F</sup> opGreatEq(ScalarType) : boolean
- <sup>F</sup> opGreat(ScalarType) : boolean
- <sup>F</sup> isValueSet() : boolean
- <sup>F</sup> abs() : ScalarType
- <sup>F</sup> absAssign() : ScalarType
- <sup>F</sup> sign() : double
- <sup>F</sup> toString() : String
- <sup>F</sup> toXMLString() : String
- <sup>F</sup> fromXMLString(String) : boolean
- <sup>F</sup> fromXMLNode(Node) : boolean
- magnitude(ScalarType, ScalarType, ScalarType) : ScalarType
- ◆<sup>C</sup> GenericScalar()
- ◆<sup>F</sup> setValue(double) : ScalarType
- ◆<sup>F</sup> getValue() : double
- ◆ modifyValue(double) : double
- ◆ checkValue(double) : void
- ◆<sup>A</sup> getScalarName() : String
- ◆<sup>A</sup> getDefaultUnits() : String
- ◆<sup>A</sup> ScalarTypeConstructorSurrogate(GenericScalar<ScalarType>) : ScalarType
- <sup>F</sup> writeObject(byte[], int) : int
- <sup>F</sup> readObject(byte[], int) : int
- <sup>F</sup> calculateWriteSize() : int
- <sup>F</sup> compareTo(ScalarType) : int

## GenericVector

- ◇ x : ScalarT
- ◇ y : ScalarT
- ◇ z : ScalarT
- ◇  GenericVector()
-  GenericVector(GenericVector<ScalarT, VectorT>)
-  GenericVector(GenericVector<ScalarT, VectorT>, BaseCartesianCoordinateSystem3D)
- opCopy() : VectorT
-  opAssign(GenericVector<ScalarT, VectorT>) : VectorT
- magnitude() : ScalarT
-  getScaled(ScalarT) : VectorT
-  opAdd(GenericVector<ScalarT, VectorT>) : VectorT
-  opSub(GenericVector<ScalarT, VectorT>) : VectorT
- opNeg() : VectorT
-  opAddAssign(GenericVector<ScalarT, VectorT>) : VectorT
-  opSubAssign(GenericVector<ScalarT, VectorT>) : VectorT
- opMult(double) : VectorT
-  opMultAssign(double) : VectorT
-  opDiv(double) : VectorT
-  opDivAssign(double) : VectorT
-  opEq(GenericVector<ScalarT, VectorT>) : boolean
-  opCompare(GenericVector<ScalarT, VectorT>) : int
-  opNotEq(GenericVector<ScalarT, VectorT>) : boolean
-  toString() : String
-  writeObject(byte[], int) : int
-  readObject(byte[], int) : int
- ◇  getVectorName() : String
- ◇  GenericVector(ScalarT, ScalarT, ScalarT, BaseCartesianCoordinateSystem3D)
- ◇ getX() : ScalarT
- ◇ getY() : ScalarT
- ◇ getZ() : ScalarT
-  calculateWriteSize() : int
-  VectorTypeConstructorSurrogate(GenericVector<ScalarT, VectorT>) : VectorT
-  fromXMLNode(Node) : boolean
-  fromXMLString(String) : boolean
-  toXMLString() : String
-  isValueSet() : boolean















































## JavaTime

-  MJDN.UTC\_1\_JAN\_1970 : int
-  MILLISECONDS\_PER\_SECOND : double
-  SECONDS\_PER\_DAY : double
-  time(long) : Time
-  time(Date) : Time
-  getJavaTime(Time) : long
-  getJavaDate(Time) : Date
-  JavaTime()
- ◇  getMJDN.UTC\_1\_JAN\_1970() : int

























## Length

- <sup>C</sup> Length()
- <sup>C</sup> Length(Length)
- <sup>C</sup> Length(GenericScalar<Length>)
- setInMeters(double) : Length
- setInCentimeters(double) : Length
- setInMillimeters(double) : Length
- setInMicrons(double) : Length
- setInAngstroms(double) : Length
- setInNanometers(double) : Length
- setInKilometers(double) : Length
- setInFeet(double) : Length
- setInYards(double) : Length
- setInKiloyards(double) : Length
- setInDataMiles(double) : Length
- setInStatuteMiles(double) : Length
- setInNauticalMiles(double) : Length
- getInMeters() : double
- getInCentimeters() : double
- getInMillimeters() : double
- getInMicrons() : double
- getInAngstroms() : double
- getInNanometers() : double
- getInKilometers() : double
- getInFeet() : double
- getInYards() : double
- getInKiloyards() : double
- getInDataMiles() : double
- getInStatuteMiles() : double
- getInNauticalMiles() : double
- ◆ <sup>S</sup> getFEET\_PER\_STATUTE\_MILE() : double
- ◆ <sup>S</sup> getFEET\_PER\_DATA\_MILE() : double
- ◆ <sup>S</sup> getMETERS\_PER\_NAUTICAL\_MILE() : double
- ◆ <sup>S</sup> getMETERS\_PER\_FOOT() : double
- ◆ <sup>S</sup> getMETERS\_PER\_KILOMETER() : double
- ◆ <sup>S</sup> getDECIMETERS\_PER\_METER() : double
- ◆ <sup>S</sup> getCENTIMETERS\_PER\_METER() : double
- ◆ <sup>S</sup> getMILLIMETERS\_PER\_METER() : double
- ◆ <sup>S</sup> getMICRONS\_PER\_METER() : double
- ◆ <sup>S</sup> getANGSTROMS\_PER\_METER() : double
- ◆ <sup>S</sup> getNANOMETERS\_PER\_METER() : double
- ◆ <sup>S</sup> getFEET\_PER\_YARD() : double
- ◆ <sup>S</sup> getYARDS\_PER\_KILOYARD() : double
- ◆ <sup>S</sup> getMETERS\_PER\_YARD() : double
- ◆ <sup>S</sup> getMETERS\_PER\_STATUTE\_MILE() : double
- ◆ <sup>S</sup> getMETERS\_PER\_DATA\_MILE() : double
- ◆ <sup>S</sup> getMETERS\_PER\_KILOYARD() : double
- ◆ <sup>S</sup> getFEET\_PER\_METER() : double
- ◆ <sup>S</sup> getYARDS\_PER\_METER() : double
- ◆ <sup>S</sup> getKILOMETERS\_PER\_METER() : double
- ◆ <sup>S</sup> getMETERS\_PER\_DECIMETER() : double
- ◆ <sup>S</sup> getMETERS\_PER\_CENTIMETER() : double
- ◆ <sup>S</sup> getMETERS\_PER\_MILLIMETER() : double
- ◆ <sup>S</sup> getMETERS\_PER\_MICRON() : double
- ◆ <sup>S</sup> getMETERS\_PER\_ANGSTROM() : double
- ◆ <sup>S</sup> getMETERS\_PER\_NANOMETER() : double
- ◆ <sup>S</sup> getKILOYARDS\_PER\_METER() : double
- ◆ <sup>S</sup> getDATA\_MILES\_PER\_METER() : double
- ◆ <sup>S</sup> getSTATUTE\_MILES\_PER\_METER() : double
- ◆ <sup>S</sup> getNAUTICAL\_MILES\_PER\_METER() : double
- ◆ <sup>△</sup> ScalarTypeConstructorSurrogate(GenericScalar<Length>) : Length
- ◆ <sup>△</sup> getScalarName() : String
- ◆ <sup>△</sup> getDefaultUnits() : String
- <sup>S</sup> zero() : Length

## Mass









-   POUNDSMASS\_PER\_KILOGRAM : double
-   GRAMS\_PER\_KILOGRAM : double
-   METRIC\_TONS\_PER\_KILOGRAM : double
-   KILOGRAMS\_PER\_POUNDMASS : double
-   KILOGRAMS\_PER\_GRAM : double
-   KILOGRAMS\_PER\_METRIC\_TON : double
-   Mass()
-   Mass(Mass)
-   Mass(GenericScalar<Mass>)
-  setInPoundsMass(double) : Mass
-  setInKilograms(double) : Mass
-  setInGrams(double) : Mass
-  setInMetricTons(double) : Mass
-  getInPoundsMass() : double
-  getInKilograms() : double
-  getInGrams() : double
-  getInMetricTons() : double
-   getPOUNDSMASS\_PER\_KILOGRAM() : double
-   getGRAMS\_PER\_KILOGRAM() : double
-   getMETRIC\_TONS\_PER\_KILOGRAM() : double
-   getKILOGRAMS\_PER\_POUNDMASS() : double
-   getKILOGRAMS\_PER\_GRAM() : double
-   getKILOGRAMS\_PER\_METRIC\_TON() : double
-   getDefaultUnits() : String
-   ScalarTypeConstructorSurrogate(GenericScalar<Mass>) : Mass
-   getScalarName() : String
-   zero() : Mass

## Month







-  January
-  February
-  March
-  April
-  May
-  June
-  July
-  August
-  September
-  October
-  November
-  December
-  value : int
-  Month(int)
-  getMonthNumber() : int
-  getMonthByNumber(int) : Month
-  opEq(Month) : boolean
-  opNotEq(Month) : boolean
-  opLess(Month) : boolean
-  opLessEq(Month) : boolean
-  opGreat(Month) : boolean
-  opGreatEq(Month) : boolean
-  opIncr() : Month
-  opDecr() : Month

## NonBaseCoordinateSystem3D












### Point

-  coords : CoordT
-  getCoordinateSystem() : CoordT
-  getBaseCartesianCoordinateSystem() : BaseCartesianCoordinateSystem3D
-  isCoordinateSystemSet() : boolean
-  setCoordinateSystem(CoordT) : void
-  Point(CoordT)
-  Point()
-  Point(Point<CoordT>)











### PositionVector

-  PositionVector()
-  PositionVector(GenericVector<Length, PositionVector>)
-  PositionVector(GenericVector<Length, PositionVector>, BaseCartesianCoordinateSystem3D)
-  PositionVector(Length, Length, Length, BaseCartesianCoordinateSystem3D)
-  VectorTypeConstructorSurrogate(GenericVector<Length, PositionVector>) : PositionVector
-  getVectorName() : String





## Power

-  Power()
-  Power(Power)
-  Power(GenericScalar<Power>)
-  setInWatts(double) : Power
-  setIndBm(double) : Power
-  getInWatts() : double
-  getIndBm() : double
-  getDefaultUnits() : String
-  ScalarTypeConstructorSurrogate(GenericScalar<Power>) : Power
-  getScalarName() : String
-  zero() : Power




















## Probability

-  Probability()
-  Probability(GenericScalar<Probability>)
-  setProbability(double) : Probability
-  getProbability() : double
-  opMult(Probability) : Probability
-  checkValue(double) : void
-  getDefaultUnits() : String
-  ScalarTypeConstructorSurrogate(GenericScalar<Probability>) : Probability
-  getScalarName() : String
-  zero() : Probability

## Reference






















































































































































































-  value : int
-  test(int)
-  getValue() : int
-  set(int) : void

## Rotation3D

-  base : BaseCartesianCoordinateSystem3D
-  r11 : double
-  r12 : double
-  r13 : double
-  r21 : double
-  r22 : double
-  r23 : double
-  r31 : double
-  r32 : double
-  r33 : double
-  Rotation3D(Rotation3D)
-  Rotation3D(Rotation3D, BaseCartesianCoordinateSystem3D)
-  getBaseCartesianCoordinateSystem() : BaseCartesianCoordinateSystem3D
-  Rotation3D(BaseCartesianCoordinateSystem3D)
-  identity(BaseCartesianCoordinateSystem3D) : Rotation3D
-  inverse() : Rotation3D
-  opAssign(Rotation3D) : Rotation3D
-  opMult(Rotation3D) : Rotation3D
-  getRepresentation(Reference<Double>, Reference<Double>, Reference<Double>, Reference<Double>, Reference<Double>, Reference<Double>, Reference<Double>, Reference<Double>, Reference<Double>, Reference<Double>) : void
-  setRotation(double, double, double, double, double, double, double, double, double, double) : void
-  isCompatibleWith(VectorT) <ScalarT extends GenericScalar<ScalarT>, VectorT extends GenericVector<ScalarT, VectorT>> : boolean
-  toString() : String
-  writeObject(byte[], int) : int
-  readObject(byte[], int) : int
-  calculateWriteSize() : int


# ScalarMath

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-   `minimumAngularDistance(AngularLength, AngularLength) : AngularLength`
-   `isAngleInRange(AngularLength, AngularLength, AngularLength, boolean) : boolean`
-   `cos(AngularLength) : double`
-   `sin(AngularLength) : double`
-   `tan(AngularLength) : double`
-   `acos(double) : AngularLength`
-   `asin(double) : AngularLength`
-   `atan(double) : AngularLength`
-   `atan2(Length, Length) : AngularLength`
-   `sqrt(Area) : Length`
-   `sqrt(TimeLengthSquared) : TimeLength`
-   `sqrt(FrequencySquared) : Frequency`
-   `opMult(Probability, ScalarT) <ScalarT extends GenericScalar<ScalarT>> : ScalarT`
-   `opMult(ScalarT, Probability) <ScalarT extends GenericScalar<ScalarT>> : ScalarT`
-   `opMult(AngularLength, Length) : Length`
-   `opMult(Length, AngularLength) : Length`
-   `opMult(Length, Frequency) : Speed`
-   `opMult(Frequency, Length) : Speed`
-   `opMult(Length, AngularSpeed) : Speed`
-   `opMult(AngularSpeed, Length) : Speed`
-   `opMult(AngularLength, Frequency) : AngularSpeed`
-   `opMult(Frequency, AngularLength) : AngularSpeed`
-   `opMult(TimeLength, Frequency) : double`
-   `opMult(Frequency, TimeLength) : double`
-   `opMult(Speed, TimeLength) : Length`
-   `opMult(TimeLength, Speed) : Length`
-   `opMult(AngularSpeed, TimeLength) : AngularLength`
-   `opMult(TimeLength, AngularSpeed) : AngularLength`
-   `opMult(Length, FrequencySquared) : Acceleration`
-   `opMult(FrequencySquared, Length) : Acceleration`
-   `opMult(Acceleration, TimeLengthSquared) : Length`
-   `opMult(TimeLengthSquared, Acceleration) : Length`
-   `opMult(Acceleration, TimeLength) : Speed`
-   `opMult(TimeLength, Acceleration) : Speed`
-   `opMult(Speed, Frequency) : Acceleration`
-   `opMult(Frequency, Speed) : Acceleration`
-   `opMult(Speed, AngularSpeed) : Acceleration`
-   `opMult(AngularSpeed, Speed) : Acceleration`
-   `opMult(Frequency, Frequency) : FrequencySquared`
-   `opMult(FrequencySquared, TimeLength) : Frequency`
-   `opMult(TimeLength, FrequencySquared) : Frequency`
-   `opMult(FrequencySquared, TimeLengthSquared) : double`
-   `opMult(TimeLengthSquared, FrequencySquared) : double`
-   `opMult(TimeLength, TimeLength) : TimeLengthSquared`
-   `opMult(TimeLengthSquared, Frequency) : TimeLength`
-   `opMult(Frequency, TimeLengthSquared) : TimeLength`
-   `opMult(Length, Length) : Area`
-   `opMult(AngularLength, Area) : Area`
-   `opMult(Area, AngularLength) : Area`
-   `opMult(AngularAcceleration, TimeLength) : AngularSpeed`
-   `opMult(TimeLength, AngularAcceleration) : AngularSpeed`
-   `opMult(AngularSpeed, Frequency) : AngularAcceleration`
-   `opMult(Frequency, AngularSpeed) : AngularAcceleration`
-   `opMult(AngularLength, FrequencySquared) : AngularAcceleration`
-   `opMult(FrequencySquared, AngularLength) : AngularAcceleration`
-   `opMult(AngularAcceleration, TimeLengthSquared) : AngularLength`
-   `opMult(TimeLengthSquared, AngularAcceleration) : AngularLength`
-   `opMult(Volume, FrequencySquared) : AccelerationFlux`
-   `opMult(FrequencySquared, Volume) : AccelerationFlux`
-   `opMult(Area, Acceleration) : AccelerationFlux`
-   `opMult(Acceleration, Area) : AccelerationFlux`
-   `opMult(AccelerationFlux, TimeLengthSquared) : Volume`
-   `opMult(TimeLengthSquared, AccelerationFlux) : Volume`
-   `opMult(Length, Area) : Volume`
-   `opMult(Area, Length) : Volume`
-   `opDiv(double, TimeLength) : Frequency`
-   `opDiv(double, Frequency) : TimeLength`
-   `opDiv(Length, TimeLength) : Speed`
-   `opDiv(Length, Speed) : TimeLength`
-   `opDiv(AngularLength, TimeLength) : AngularSpeed`
-   `opDiv(Speed, Length) : Frequency`
-   `opDiv(Speed, Frequency) : Length`
-   `opDiv(AngularSpeed, AngularLength) : Frequency`
-   `opDiv(AngularSpeed, Frequency) : AngularLength`
-   `opDiv(Acceleration, Length) : FrequencySquared`
-   `opDiv(Acceleration, FrequencySquared) : Length`
-   `opDiv(Length, TimeLengthSquared) : Acceleration`
-   `opDiv(Speed, TimeLength) : Acceleration`
-   `opDiv(Acceleration, Speed) : Frequency`
-   `opDiv(Acceleration, Frequency) : Speed`
-   `opDiv(Frequency, TimeLength) : FrequencySquared`
-   `opDiv(FrequencySquared, Frequency) : Frequency`
-   `opDiv(TimeLength, Frequency) : TimeLengthSquared`
-   `opDiv(TimeLengthSquared, TimeLength) : TimeLength`
-   `opDiv(Area, Length) : Length`
-   `opDiv(AngularSpeed, TimeLength) : AngularAcceleration`
-   `opDiv(AngularLength, TimeLengthSquared) : AngularAcceleration`
-   `opDiv(AngularAcceleration, Frequency) : AngularSpeed`
-   `opDiv(AngularAcceleration, FrequencySquared) : AngularLength`
-   `opDiv(Volume, TimeLengthSquared) : AccelerationFlux`
-   `opDiv(AccelerationFlux, FrequencySquared) : Volume`
-   `opDiv(AccelerationFlux, Area) : Acceleration`
-   `opDiv(AccelerationFlux, Volume) : FrequencySquared`
-   `opDiv(Volume, Length) : Area`
-   `opDiv(Volume, Area) : Length`



## SingleAxisRotation

 SingleAxisRotation(VectorT, AngularLength) <ScalarT extends GenericScalar<ScalarT>, VectorT extends GenericVector<ScalarT, VectorT>>

## SolidAngle

 STERADIANS\_PER\_FULL\_SPHERE : double  
 FULL\_SPHERES\_PER\_STERADIAN : double  
 FOUR\_PI : double  
 TWO\_PI : double  
 PI : double  
 PI\_OVER\_TWO : double  
 SolidAngle()  
 SolidAngle(GenericScalar<SolidAngle>)  
 setInSteradians(double) : SolidAngle  
 setInFractionalSpheres(double) : SolidAngle  
 setBySphericalPolygon(Point[]) : SolidAngle  
 swap(int[], double[], double[], int, int) : void  
 contains(PositionVector, PositionVector, PositionVector, AngularLength) : boolean  
 getInSteradians() : double  
 getInFractionalSpheres() : double  
 restricted() : SolidAngle  
 fourPi() : SolidAngle  
 twoPi() : SolidAngle  
 pi() : SolidAngle  
 piOverTwo() : SolidAngle  
 getDefaultUnits() : String  
 getPI() : double  
 getFOUR\_PI() : double  
 getTWO\_PI() : double  
 getPI\_OVER\_TWO() : double  
 getSTERADIANS\_PER\_FULL\_SPHERE() : double  
 getFULL\_SPHERES\_PER\_STERADIAN() : double  
 ScalarTypeConstructorSurrogate(GenericScalar<SolidAngle>) : SolidAngle  
 getScalarName() : String  
 zero() : SolidAngle

# Speed

- ⚡ F METERS\_PER\_SECOND\_PER\_FOOT\_PER\_SECOND : double
- ⚡ F METERS\_PER\_SECOND\_PER\_KILOYARD\_PER\_HOUR : double
- ⚡ F METERS\_PER\_SECOND\_PER\_KILOMETER\_PER\_HOUR : double
- ⚡ F METERS\_PER\_SECOND\_PER\_KILOMETER\_PER\_SECOND : double
- ⚡ F METERS\_PER\_SECOND\_PER\_STATUTE\_MILE\_PER\_HOUR : double
- ⚡ F METERS\_PER\_SECOND\_PER\_DATA\_MILE\_PER\_HOUR : double
- ⚡ F METERS\_PER\_SECOND\_PER\_DATA\_MILE\_PER\_SECOND : double
- ⚡ F METERS\_PER\_SECOND\_PER\_KNOT : double
- ⚡ F METERS\_PER\_SECOND\_PER\_C : double
- ⚡ F FEET\_PER\_SECOND\_PER\_METER\_PER\_SECOND : double
- ⚡ F KILOYARDS\_PER\_HOUR\_PER\_METER\_PER\_SECOND : double
- ⚡ F KILOMETERS\_PER\_HOUR\_PER\_METER\_PER\_SECOND : double
- ⚡ F KILOMETERS\_PER\_SECOND\_PER\_METER\_PER\_SECOND : double
- ⚡ F STATUTE\_MILES\_PER\_HOUR\_PER\_METER\_PER\_SECOND : double
- ⚡ F DATA\_MILES\_PER\_HOUR\_PER\_METER\_PER\_SECOND : double
- ⚡ F DATA\_MILES\_PER\_SECOND\_PER\_METER\_PER\_SECOND : double
- ⚡ F KNOTS\_PER\_METER\_PER\_SECOND : double
- ⚡ F CS\_PER\_METER\_PER\_SECOND : double
- C Speed()
- C Speed(GenericScalar<Speed>)
- C Speed(Speed)
- S speedOfLightInAVacuum() : Speed
- setInMetersPerSecond(double) : Speed
- setInKilometersPerHour(double) : Speed
- setInKilometersPerSecond(double) : Speed
- setInFeetPerSecond(double) : Speed
- setInKiloyardsPerHour(double) : Speed
- setInDataMilesPerHour(double) : Speed
- setInDataMilesPerSecond(double) : Speed
- setInStatuteMilesPerHour(double) : Speed
- setInKnots(double) : Speed
- setInFractionOfc(double) : Speed
- getInMetersPerSecond() : double
- getInKilometersPerHour() : double
- getInKilometersPerSecond() : double
- getInFeetPerSecond() : double
- getInKiloyardsPerHour() : double
- getInDataMilesPerHour() : double
- getInDataMilesPerSecond() : double
- getInStatuteMilesPerHour() : double
- getInKnots() : double
- getInFractionOfc() : double
- ◆ S getMETERS\_PER\_SECOND\_PER\_FOOT\_PER\_SECOND() : double
- ◆ S getMETERS\_PER\_SECOND\_PER\_KILOYARD\_PER\_HOUR() : double
- ◆ S getMETERS\_PER\_SECOND\_PER\_KILOMETER\_PER\_HOUR() : double
- ◆ S getMETERS\_PER\_SECOND\_PER\_KILOMETER\_PER\_SECOND() : double
- ◆ S getMETERS\_PER\_SECOND\_PER\_STATUTE\_MILE\_PER\_HOUR() : double
- ◆ S getMETERS\_PER\_SECOND\_PER\_DATA\_MILE\_PER\_HOUR() : double
- ◆ S getMETERS\_PER\_SECOND\_PER\_DATA\_MILE\_PER\_SECOND() : double
- ◆ S getMETERS\_PER\_SECOND\_PER\_KNOT() : double
- ◆ S getMETERS\_PER\_SECOND\_PER\_C() : double
- ◆ S getFEET\_PER\_SECOND\_PER\_METER\_PER\_SECOND() : double
- ◆ S getKILOYARDS\_PER\_HOUR\_PER\_METER\_PER\_SECOND() : double
- ◆ S getKILOMETERS\_PER\_HOUR\_PER\_METER\_PER\_SECOND() : double
- ◆ S getKILOMETERS\_PER\_SECOND\_PER\_METER\_PER\_SECOND() : double
- ◆ S getSTATUTE\_MILES\_PER\_HOUR\_PER\_METER\_PER\_SECOND() : double
- ◆ S getDATA\_MILES\_PER\_HOUR\_PER\_METER\_PER\_SECOND() : double
- ◆ S getDATA\_MILES\_PER\_SECOND\_PER\_METER\_PER\_SECOND() : double
- ◆ S getKNOTS\_PER\_METER\_PER\_SECOND() : double
- ◆ S getCS\_PER\_METER\_PER\_SECOND() : double
- ▲ getDefaultUnits() : String
- ◆ ▲ ScalarTypeConstructorSurrogate(GenericScalar<Speed>) : Speed
- ◆ ▲ getScalarName() : String
- S zero() : Speed
- S setInMetersPerSecondStatic(double) : Speed

# SphericalCoords

```
lenZero : Length
angZero : AngularLength
phiMax : AngularLength
thetaMax : AngularLength
SphericalCoords(BaseCartesianCoordinateSystem3D)
point(Length, AngularLength, AngularLength) : Point
point(PositionVector) : Point
position(Length, AngularLength, AngularLength) : PositionVector
position(Point) : PositionVector
getRho(PositionVector) : Length
getRho(Point) : Length
getPhi(PositionVector) : AngularLength
getPhi(Point) : AngularLength
getTheta(PositionVector) : AngularLength
getTheta(Point) : AngularLength
getRhoPhiTheta(PositionVector, Length, AngularLength, AngularLength) : void
getRhoPhiTheta(Point, Length, AngularLength, AngularLength) : void
checkRPT(Length, AngularLength, AngularLength) : void
rptToxyz(Length, AngularLength, AngularLength, Length, Length, Length) : void
zeroPoint() : Point
position(GenericPoint<Scalar1T, Scalar2T, Scalar3T, CoordT>) <Scalar1T extends GenericScalar<Scalar1T>, Scalar2T extends GenericScalar<Scalar2T>, Scalar3T extends GenericScalar<Scalar3T>, CoordT extends CoordinateSystem3D> : PositionVector
getCoordinateSystemName() : String
```

# TAITime

```
TAITime()
time(int, Month, int, int, int, double) : Time
time(int, Month, int, int, AMPM, int, double) : Time
time(int, TimeLength) : Time
getTAIDayAndTime(Time, Reference<Integer>, TimeLength) : void
mjdntAIToDayOfWeek(int) : int
mjdntAIToYear(int, Reference<Integer>, Reference<Integer>) : void
yearToMjdntAI(int) : int
dayOfYearToMonthDay(int, int, Reference<Month>, Reference<Integer>) : void
monthDayToDayOfYear(int, Month, int) : int
```

## Time

- ✚<sup>S</sup> F XMLClassName : String
- ✚<sup>S</sup> F RotRefTime : Time
- ✚<sup>S</sup> F RotRef : AngularLength
- ✚<sup>S</sup> F omega : AngularSpeed
- ✚<sup>S</sup> F ORIGIN\_MODIFIED\_JULIAN\_DAY\_NUMBER\_TAI : int
- ▣ seconds : long
- ▣ fractions : double
- ▣ setFlag : boolean
- ◆<sup>C</sup> Time(long, double)
- <sup>C</sup> Time()
- <sup>C</sup> Time(Time)
- opAssign(Time) : Time
- ◆ getSeconds() : long
- ◆ getFractions() : double
- opLess(Time) : boolean
- opMin(Time) : Time
- opMax(Time) : Time
- opLessEq(Time) : boolean
- opGreat(Time) : boolean
- opGreatEq(Time) : boolean
- opEq(Time) : boolean
- opNotEq(Time) : boolean
- opSub(Time) : TimeLength
- opAdd(TimeLength) : Time
- opAddAssign(TimeLength) : Time
- opSub(TimeLength) : Time
- opSubAssign(TimeLength) : Time
- getMeanGreenwichSiderealTime() : AngularLength
- isSet() : boolean
- ✚<sup>S</sup> ◆ getRotationalReferenceAngle() : AngularLength
- ✚<sup>S</sup> ◆ getMeanEarthRotationRate() : AngularSpeed
- dummy() : Time
- ✚<sup>S</sup> ◆ now() : Time
- ▲ toString() : String
- toFormattedString() : String
- fromFormattedString(String) : boolean
- ✚<sup>S</sup> ◆ writeObject(byte[], int) : int
- ✚<sup>S</sup> ◆ readObject(byte[], int) : int
- ◆<sup>S</sup> getOriginModifiedJulianDayNumberTAI() : int
- ✚<sup>S</sup> ◆ calculateWriteSize() : int
- ✚<sup>S</sup> ◆ fromXMLNode(Node) : boolean
- ✚<sup>S</sup> ◆ fromXMLString(String) : boolean
- ✚<sup>S</sup> ◆ toXMLString() : String
- isValueSet() : boolean
- ▲ compareTo(Time) : int
- <sup>S</sup> min(Time...) : Time
- <sup>S</sup> max(Time...) : Time

# TimeLength

```
⚡ F SI_SECONDS_PER_MEAN_SOLAR_DAY_1999 : double
⚡ F SECONDS_PER_MINUTE : double
⚡ F SECONDS_PER_HOUR : double
⚡ F SI_SECONDS_PER_MEAN_SOLAR_SECOND_1999 : double
⚡ F MEAN_SOLAR_SECONDS_PER_SI_SECOND_1999 : double
⚡ F SECONDS_PER_MILLISECOND : double
⚡ F SECONDS_PER_MICROSECOND : double
⚡ F SI_SECONDS_PER_SIDEREAL_SECOND : double
⚡ F SI_SECONDS_PER_SIDEREAL_MINUTE : double
⚡ F SI_SECONDS_PER_SIDEREAL_HOUR : double
⚡ F MILLISECONDS_PER_SECOND : double
⚡ F MICROSECONDS_PER_SECOND : double
⚡ F SIDEREAL_SECONDS_PER_SI_SECOND : double
⚡ F SI_SECONDS_PER_CALENDAR_DAY : double
⚡ F CALENDAR_DAYS_PER_SI_SECOND : double
⚡ F MEAN_SOLAR_DAYS_PER_SI_SECOND_1999 : double
⚡ F SI_SECONDS_PER_SIDEREAL_DAY : double
⚡ F SIDEREAL_DAYS_PER_SI_SECOND : double
⚡ F SI_SECONDS_PER_JULIAN_CENTURY : double
⚡ F JULIAN_CENTURIES_PER_SI_SECOND : double
● C TimeLength()
● C TimeLength(GenericScalar<TimeLength>)
● C TimeLength(TimeLength)
● setInSeconds(double) : TimeLength
● setInMilliSeconds(double) : TimeLength
● setInMicroSeconds(double) : TimeLength
● setInHMS(int, int, double) : TimeLength
● setInSiderealSeconds(double) : TimeLength
● setInSiderealHMS(int, int, double) : TimeLength
● setInCalendarDays(double) : TimeLength
● setInMeanSolarDays(double) : TimeLength
● setInMeanSolarSeconds(double) : TimeLength
● setInSiderealDays(double) : TimeLength
● setInJulianCenturies(double) : TimeLength
● getInSeconds() : double
● getInMilliSeconds() : double
● getInMicroSeconds() : double
🔗 getInHMS(Reference<Integer>, Reference<Integer>, Reference<Double>) : void
● getInSiderealSeconds() : double
🔗 getInSiderealHMS(Reference<Integer>, Reference<Integer>, Reference<Double>) : void
● getInCalendarDays() : double
● getInMeanSolarDays() : double
● getInMeanSolarSeconds() : double
● getInSiderealDays() : double
● getInJulianCenturies() : double
💎 S getMEAN_SOLAR_DAYS_PER_SIDEREAL_DAY() : double
💎 S getSI_SECONDS_PER_MEAN_SOLAR_DAY_1999() : double
💎 S getSECONDS_PER_MINUTE() : double
💎 S getMINUTES_PER_HOUR() : double
💎 S getHOURS_PER_DAY() : double
💎 S getCALENDAR_DAYS_PER_JULIAN_CENTURY() : double
💎 S getSECONDS_PER_HOUR() : double
💎 S getSECONDS_PER_DAY() : double
💎 S getSI_SECONDS_PER_MEAN_SOLAR_SECOND_1999() : double
💎 S getMEAN_SOLAR_SECONDS_PER_SI_SECOND_1999() : double
💎 S getSECONDS_PER_MILLISECOND() : double
💎 S getSECONDS_PER_MICROSECOND() : double
💎 S getSI_SECONDS_PER_SIDEREAL_SECOND() : double
💎 S getSI_SECONDS_PER_SIDEREAL_MINUTE() : double
💎 S getSI_SECONDS_PER_SIDEREAL_HOUR() : double
💎 S getMILLISECONDS_PER_SECOND() : double
💎 S getSIDEREAL_SECONDS_PER_SI_SECOND() : double
💎 S getSI_SECONDS_PER_CALENDAR_DAY() : double
💎 S getCALENDAR_DAYS_PER_SI_SECOND() : double
💎 S getMEAN_SOLAR_DAYS_PER_SI_SECOND_1999() : double
💎 S getSI_SECONDS_PER_SIDEREAL_DAY() : double
💎 S getSIDEREAL_DAYS_PER_SI_SECOND() : double
💎 S getSI_SECONDS_PER_JULIAN_CENTURY() : double
💎 S getJULIAN_CENTURIES_PER_SI_SECOND() : double
💎 S getMICROSECONDS_PER_SECOND() : double
● ▲ getDefaultUnits() : String
💎 ▲ ScalarTypeConstructorSurrogate(GenericScalar<TimeLength>) : TimeLength
💎 ▲ getScalarName() : String
● S zero() : TimeLength
● S setInSecondsStatic(double) : TimeLength
```

## TimeLengthSquared

- ⚠️ <sup>S</sup> <sup>F</sup> SI\_SEC\_SQ\_PER\_SIDEREAL\_SEC\_SQ : double
- ⚠️ <sup>S</sup> <sup>F</sup> SIDEREAL\_SEC\_SQ\_PER\_SI\_SEC\_SQ : double
- <sup>C</sup> TimeLengthSquared()
- <sup>C</sup> TimeLengthSquared(GenericScalar<TimeLengthSquared>)
- <sup>C</sup> TimeLengthSquared(TimeLengthSquared)
- setInSecondsSquared(double) : TimeLengthSquared
- setInSiderealSecondsSquared(double) : TimeLengthSquared
- getInSecondsSquared() : double
- getInSiderealSecondsSquared() : double
- ◆ <sup>S</sup> getSI\_SEC\_SQ\_PER\_SIDEREAL\_SEC\_SQ() : double
- ◆ <sup>S</sup> getSIDEREAL\_SEC\_SQ\_PER\_SI\_SEC\_SQ() : double
- ▲ getDefaultUnits() : String
- ◆ ▲ ScalarTypeConstructorSurrogate(GenericScalar<TimeLengthSquared>) : TimeLengthSquared
- ◆ ▲ getScalarName() : String
- <sup>S</sup> zero() : TimeLengthSquared

## TimeStandard

- SECONDS\_PER\_DAY : double
- ORIGIN\_MODIFIED\_JULIAN\_DAY\_NUMBER\_TAI : int
- MJDN\_1\_JANUARY\_1901 : int
- DAYS\_PER\_FOUR\_YEARS : int
- DAYS\_PER\_NON\_LEAP\_YEAR : int
- DAYS\_PER\_WEEK : int
- LAST\_DAY\_OF\_JANUARY : int
- LAST\_DAY\_OF\_NON\_LEAP\_FEBRUARY : int
- LAST\_DAY\_OF\_NON\_LEAP\_MARCH : int
- LAST\_DAY\_OF\_NON\_LEAP\_APRIL : int
- LAST\_DAY\_OF\_NON\_LEAP\_MAY : int
- LAST\_DAY\_OF\_NON\_LEAP\_JUNE : int
- LAST\_DAY\_OF\_NON\_LEAP\_JULY : int
- LAST\_DAY\_OF\_NON\_LEAP\_AUGUST : int
- LAST\_DAY\_OF\_NON\_LEAP\_SEPTEMBER : int
- LAST\_DAY\_OF\_NON\_LEAP\_OCTOBER : int
- LAST\_DAY\_OF\_NON\_LEAP\_NOVEMBER : int
- LAST\_DAY\_OF\_NON\_LEAP\_DECEMBER : int

**E** AMPM

- TimeStandard()
- time(int, TimeLength) : Time
- getTAIDayAndTime(Time, Reference<Integer>, TimeLength) : void
- mjdntAIToDayOfWeek(int) : int
- mjdntAIToYear(int, Reference<Integer>, Reference<Integer>) : void
- yearToMjdntAI(int) : int
- dayOfYearToMonthDay(int, int, Reference<Month>, Reference<Integer>) : void
- monthDayToDayOfYear(int, Month, int) : int
- getMJDN\_1\_JANUARY\_1901() : int
- getDAYS\_PER\_FOUR\_YEARS() : int
- getDAYS\_PER\_NON\_LEAP\_YEAR() : int
- getDAYS\_PER\_WEEK() : int
- getLastDayOfJanuary() : int
- getLastDayOfNonLeapFebruary() : int
- getLastDayOfNonLeapMarch() : int
- getLastDayOfNonLeapApril() : int
- getLastDayOfNonLeapMay() : int
- getLastDayOfNonLeapJune() : int
- getLastDayOfNonLeapJuly() : int
- getLastDayOfNonLeapAugust() : int
- getLastDayOfNonLeapSeptember() : int
- getLastDayOfNonLeapOctober() : int
- getLastDayOfNonLeapNovember() : int
- getLastDayOfNonLeapDecember() : int

## UTCTime

```

S numEntries : int
SF MAX_ENTRIES : int
SF mjdIndex : int[]
SF offsetTable : TimeLength[]
SF noOffset : TimeLength
S {...}
C UTCTime()
S convertToString(Time) : String
S convertToMediumString(Time) : String
S convertToShortString(Time) : String
S convertFromShortString(String, Time) : boolean
S convertFromString(String, Time) : boolean
S time(int, Month, int, int, int, double) : Time
S time(int, Month, int, int, AMPM, int, double) : Time
S time(int, TimeLength) : Time
S getUTCDayAndTime(Time, Reference<Integer>, TimeLength) : void
S getUTCClockTime(Time, Reference<Integer>, Reference<Month>, Reference<Integer>, Reference<Integer>, Reference<Integer>, Reference<Double>) : void
S getYear(Time) : int
S getMonth(Time) : Month
S getDay(Time) : int
S getHour(Time) : int
S getMinute(Time) : int
S getSeconds(Time) : double
S mjdUTCtoDayOfWeek(int) : int
S mjdUTCtoYear(int, Reference<Integer>, Reference<Integer>) : void
S yearToMjdUTC(int) : int
S dayOfYearToMonthDay(int, int, Reference<Month>, Reference<Integer>) : void
S monthDayToDayOfYear(int, Month, int) : int
S getTAIMinusUTC(int) : TimeLength
```

## Vector

```

base : BaseCartesianCoordinateSystem3D
getBaseCartesianCoordinateSystem() : BaseCartesianCoordinateSystem3D
isCoordinateSystemSet() : boolean
setCoordinateSystem(BaseCartesianCoordinateSystem3D) : void
C Vector(BaseCartesianCoordinateSystem3D)
C Vector()
C Vector(Vector)
```

## VectorMath

```

S angle(Vector1T, Vector2T) <Scalar1T extends GenericScalar<Scalar1T>, Scalar2T extends GenericScalar<Scalar2T>, Vector1T extends GenericVector<Scalar1T, Vector1T>, Vector2T extends GenericVector<Scalar2T, Vector2T>> : AngularLength
S crossProductDirection(Vector1T, Vector2T) <Scalar1T extends GenericScalar<Scalar1T>, Scalar2T extends GenericScalar<Scalar2T>, Vector1T extends GenericVector<Scalar1T, Vector1T>, Vector2T extends GenericVector<Scalar2T, Vector2T>> : PositionVector
S orthogonalDirection(Vector1T) <ScalarT extends GenericScalar<ScalarT>, VectorT extends GenericVector<ScalarT, VectorT>> : PositionVector
S opMult(Rotation3D, PositionVector) : PositionVector
S opMult(Rotation3D, VelocityVector) : VelocityVector
S opMult(Rotation3D, AccelerationVector) : AccelerationVector
S opMult(Rotation3D, AngularVelocityVector) : AngularVelocityVector
S opMult(VelocityVector, TimeLength) : PositionVector
S opMult(TimeLength, VelocityVector) : PositionVector
S opMult(PositionVector, Frequency) : VelocityVector
S opMult(Frequency, PositionVector) : VelocityVector
S opMult(AccelerationVector, TimeLength) : VelocityVector
S opMult(TimeLength, AccelerationVector) : VelocityVector
S opMult(AccelerationVector, TimeLengthSquared) : PositionVector
S opMult(TimeLengthSquared, AccelerationVector) : PositionVector
S opMult(PositionVector, FrequencySquared) : AccelerationVector
S opMult(FrequencySquared, PositionVector) : AccelerationVector
S opMult(VelocityVector, Frequency) : AccelerationVector
S opMult(Frequency, VelocityVector) : AccelerationVector
S opMult(AngularVelocityVector, Length) : VelocityVector
S opMult(Length, AngularVelocityVector) : VelocityVector
S opMult(AngularVelocityVector, Speed) : AccelerationVector
S opMult(Speed, AngularVelocityVector) : AccelerationVector
S opDiv(PositionVector, TimeLength) : VelocityVector
S opDiv(VelocityVector, Frequency) : PositionVector
S opDiv(VelocityVector, TimeLength) : AccelerationVector
S opDiv(PositionVector, TimeLengthSquared) : AccelerationVector
S opDiv(AccelerationVector, FrequencySquared) : PositionVector
S opDiv(AccelerationVector, Frequency) : VelocityVector
S dot(PositionVector, PositionVector) : Area
S cross(AngularVelocityVector, PositionVector) : VelocityVector
S cross(PositionVector, AngularVelocityVector) : VelocityVector
S cross(AngularVelocityVector, VelocityVector) : AccelerationVector
S cross(VelocityVector, AngularVelocityVector) : AccelerationVector
```



## VelocityVector

- <sup>C</sup> VelocityVector()
- <sup>C</sup> VelocityVector(GenericVector<Speed, VelocityVector>)
- <sup>C</sup> VelocityVector(GenericVector<Speed, VelocityVector>, BaseCartesianCoordinateSystem3D)
- <sup>C</sup> VelocityVector(Speed, Speed, Speed, BaseCartesianCoordinateSystem3D)
- <sup>△</sup> VectorTypeConstructorSurrogate(GenericVector<Speed, VelocityVector>) : VelocityVector
- <sup>△</sup> <sup>F</sup> getVectorName() : String

## Volume

- <sup>△</sup> <sup>F</sup> METERS\_CUBED\_PER\_CENTIMETER\_CUBED : double
- <sup>△</sup> <sup>F</sup> METERS\_CUBED\_PER\_LITER : double
- <sup>△</sup> <sup>F</sup> METERS\_CUBED\_PER\_GALLON : double
- <sup>△</sup> <sup>F</sup> METERS\_CUBED\_PER\_FOOT\_CUBED : double
- <sup>△</sup> <sup>F</sup> CENTIMETERS\_CUBED\_PER\_METER\_CUBED : double
- <sup>△</sup> <sup>F</sup> LITERS\_PER\_METER\_CUBED : double
- <sup>△</sup> <sup>F</sup> GALLONS\_PER\_METER\_CUBED : double
- <sup>△</sup> <sup>F</sup> FEET\_CUBED\_PER\_METER\_CUBED : double
- <sup>C</sup> Volume()
- <sup>C</sup> Volume(GenericScalar<Volume>)
- setInMetersCubed(double) : Volume
- setInCubicCentimeters(double) : Volume
- setInLiters(double) : Volume
- setInGallons(double) : Volume
- setInFeetCubed(double) : Volume
- getInMetersCubed() : double
- getInCubicCentimeters() : double
- getInLiters() : double
- getInGallons() : double
- getInFeetCubed() : double
- <sup>S</sup> getMETERS\_CUBED\_PER\_CENTIMETER\_CUBED() : double
- <sup>S</sup> getCENTIMETERS\_CUBED\_PER\_METER\_CUBED() : double
- <sup>S</sup> getMETERS\_CUBED\_PER\_LITER() : double
- <sup>S</sup> getLITERS\_PER\_METER\_CUBED() : double
- <sup>S</sup> getGALLONS\_PER\_LITER() : double
- <sup>S</sup> getGALLONS\_PER\_METER\_CUBED() : double
- <sup>S</sup> getMETERS\_CUBED\_PER\_GALLON() : double
- <sup>S</sup> getMETERS\_CUBED\_PER\_FOOT\_CUBED() : double
- <sup>S</sup> getFEET\_CUBED\_PER\_METER\_CUBED() : double
- <sup>△</sup> getDefaultUnits() : String
- <sup>△</sup> <sup>△</sup> ScalarTypeConstructorSurrogate(GenericScalar<Volume>) : Volume
- <sup>△</sup> <sup>△</sup> getScalarName() : String