

$$a := 6378.137 \qquad \qquad \qquad 6378.137 \qquad \qquad \qquad (1)$$

$$b := 6356.752314 \qquad \qquad \qquad 6356.752314 \qquad \qquad \qquad (2)$$

with(LinearAlgebra) (3)

[&x, Add, Adjoint, BackwardSubstitute, BandMatrix, Basis, BezoutMatrix, BidiagonalForm, BilinearForm, CharacteristicMatrix, CharacteristicPolynomial, Column, ColumnDimension, ColumnOperation, ColumnSpace, CompanionMatrix, ConditionNumber, ConstantMatrix, ConstantVector, Copy, CreatePermutation, CrossProduct, DeleteColumn, DeleteRow, Determinant, Diagonal, DiagonalMatrix, Dimension, Dimensions, DotProduct, EigenConditionNumbers, Eigenvalues, Eigenvectors, Equal, ForwardSubstitute, FrobeniusForm, GaussianElimination, GenerateEquations, GenerateMatrix, Generic, GetResultDataType, GetResultShape, GivensRotationMatrix, GramSchmidt, HankelMatrix, HermiteForm, HermitianTranspose, HessenbergForm, HilbertMatrix, HouseholderMatrix, IdentityMatrix, IntersectionBasis, IsDefinite, IsOrthogonal, IsSimilar, IsUnitary, JordanBlockMatrix, JordanForm, KroneckerProduct, LA_Main, LUdecomposition, LeastSquares, LinearSolve, LyapunovSolve, Map, Map2, MatrixAdd, MatrixExponential, MatrixFunction, MatrixInverse, MatrixMatrixMultiply, MatrixNorm, MatrixPower, MatrixScalarMultiply, MatrixVectorMultiply, MinimalPolynomial, Minor, Modular, Multiply, NoUserValue, Norm, Normalize, NullSpace, OuterProductMatrix, Permanent, Pivot, PopovForm, QRDecomposition, RandomMatrix, RandomVector, Rank, RationalCanonicalForm, ReducedRowEchelonForm, Row, RowDimension, RowOperation, RowSpace, ScalarMatrix, ScalarMultiply, ScalarVector, SchurForm, SingularValues, SmithForm, StronglyConnectedBlocks, SubMatrix, SubVector, SumBasis, SylvesterMatrix, SylvesterSolve, ToeplitzMatrix, Trace, Transpose, TridiagonalForm, UnitVector, VandermondeMatrix, VectorAdd, VectorAngle, VectorMatrixMultiply, VectorNorm, VectorScalarMultiply, ZeroMatrix, ZeroVector, Zip]

$$r := (\theta, \phi) \rightarrow \langle a \cdot \cos(\phi) \cdot \cos(\theta), a \cdot \sin(\phi) \cdot \cos(\theta), b \cdot \sin(\theta) \rangle$$

$$(\theta, \phi) \rightarrow \langle a \cos(\phi) \cos(\theta), a \sin(\phi) \cos(\theta), b \sin(\theta) \rangle \qquad (4)$$

$$S := 35786 \qquad \qquad \qquad 35786 \qquad \qquad \qquad (5)$$

$$s := \psi \rightarrow \langle (a + S) \cdot \cos(\psi), (a + S) \cdot \sin(\psi), 0 \rangle$$

$$\psi \rightarrow \langle (a + S) \cos(\psi), (a + S) \sin(\psi), 0 \rangle \qquad (6)$$

$$\sigma := (\theta, \phi) \rightarrow \frac{1}{\text{sqrt}(a^2 \cdot \sin(\theta)^2 + b^2 \cdot \cos(\theta)^2)} \cdot \langle a \cdot \cos(\phi) \cdot \sin(\theta), a \cdot \sin(\phi) \cdot \sin(\theta), -b \cdot \cos(\theta) \rangle$$

$$(\theta, \phi) \rightarrow \frac{\langle a \cos(\phi) \sin(\theta), a \sin(\phi) \sin(\theta), -b \cos(\theta) \rangle}{\sqrt{a^2 \sin(\theta)^2 + b^2 \cos(\theta)^2}} \qquad (7)$$

$$\varepsilon := \phi \rightarrow \langle -\sin(\phi), \cos(\phi), 0 \rangle$$

$$\phi \rightarrow \langle -\sin(\phi), \cos(\phi), 0 \rangle \qquad (8)$$

$$dth := (\psi, \theta, \phi) \rightarrow \text{DotProduct}(s(\psi) - r(\theta, \phi), \sigma(\theta, \phi))$$

$$(\psi, \theta, \phi) \rightarrow \text{LinearAlgebra:-DotProduct}(s(\psi) - r(\theta, \phi), \sigma(\theta, \phi)) \quad (9)$$

$$dph := (\psi, \theta, \phi) \rightarrow \text{DotProduct}(s(\psi) - r(\theta, \phi), \varepsilon(\phi))$$

$$(\psi, \theta, \phi) \rightarrow \text{LinearAlgebra:-DotProduct}(s(\psi) - r(\theta, \phi), \varepsilon(\phi)) \quad (10)$$

$$\alpha := (\psi, \theta, \phi) \rightarrow \arctan\left(\frac{dph(\psi, \theta, \phi)}{dth(\psi, \theta, \phi)}\right)$$

$$(\psi, \theta, \phi) \rightarrow \arctan\left(\frac{dph(\psi, \theta, \phi)}{dth(\psi, \theta, \phi)}\right) \quad (11)$$

$$\beta := (\psi, \theta, \phi) \rightarrow \arccos\left(\frac{\text{sqrt}(dph(\psi, \theta, \phi)^2 + dth(\psi, \theta, \phi)^2)}{\text{VectorNorm}(s(\psi) - r(\theta, \phi), 2)}\right)$$

$$(\psi, \theta, \phi) \rightarrow \arccos\left(\frac{\sqrt{dph(\psi, \theta, \phi)^2 + dth(\psi, \theta, \phi)^2}}{\text{LinearAlgebra:-VectorNorm}(s(\psi) - r(\theta, \phi), 2)}\right) \quad (12)$$

$$\text{evalf}\left(\alpha\left(\frac{19.2 \cdot \pi}{180}, \frac{52.4 \cdot \pi}{180}, \frac{9.8 \cdot \pi}{180}\right) \cdot \frac{180}{\pi}\right)$$

$$11.79502436 \quad (13)$$

$$\text{evalf}\left(\beta\left(\frac{19.2 \cdot \pi}{180}, \frac{52.4 \cdot \pi}{180}, \frac{9.8 \cdot \pi}{180}\right) \cdot \frac{180}{\pi}\right)$$

$$29.37360053 \quad (14)$$