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Expression of the normal Eötvös matrix in series of spherical harmonics

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In this work we present the components of the normal Eötvös matrix, expressed in series of spherical harmonics at a point P in space. The expression is made for two local Cartesian systems. Let Q be the projection of the point P on a sphere of mean radius R. The first system is centered at point P, the z - axis is vertical to the sphere of mean radius R, the x - axis is parallel to the tangent line of the meridian at point Q and y - axis is parallel to the tangent line of the parallel circle at point Q. The second system is defined at point P and it is related to the normal equipotential surface passing through the same point. These expressions can be used for the evaluation of principal curvatures of normal equipotential surfaces and the plumbline curvature in space.