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Deformation analysis based on intrinsic geometry

K.Moghtased-Azar(1) , Erik W. Grafarend(2)

Institute of Geodesy - Faculty of Aerospace Engineering and Geodesy, Stuttgart University, Germany

Contact information:

Tel: +49 (0) 711 / 685 8 - 3474

Fax: +49 (0) 711 / 685 8 - 3285

Email(first author): moghtased@gis.uni-stuttgart.de

Email(second author) : grafarend@gis.uni-stuttgart.de

The main purpose of this research is concerned with use of a geometrically formulation of recently formulated by the shell theory capable to catch finite deformations. The Earth surface is assumed to have linear movement. Hence, the shell formulation falls within the class of so called differential geometrically exact theories, where, on the one hand, all nonlinearities are of geometrical origin and where on the other hand the nonlinearities are taken into account without any simplifications. The Earth's surface is given in the reference configuration $(t = 0)$ in a parameter representation with Gaussian parameter $\theta^{\alpha}(\alpha = 1, 2)$.Within static and dynamic problems we have to determine the deformed state at time $t$for the given velocities of the Earth's surface by permanent GPS solutions. From there we get the intersecting tensor field, namely kinematic variables such as surface strain tensor with related invariants and changing of curvature tensor with associated invariants (mean and Gaussian curvature) .The results of deformation analysis based on intrinsic geometry over the simulated deformation field is tested and results were success to uncover the deformation signals. Comparison of patterns of invariant space with real simulated deformation field suggested how well patterns were able to uncover geodynamical features across the tested field.