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# Finite element versus isoparametric representation of deformation,Case study: Kenai-Peninsula area

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Among the different methods that can be used for analyzing the surface deformations of the earth, geodetic approaches are the only ones that can provide us the information on the contemporary state of deformation within the Earth's crust. Several methods have been developed for this purpose. The finite element and Isoparametric approaches are two well established methods for this purpose. In this paper, the two methods are to be compared for analyzing the surface deformations of the Earth's crust. The application of developed computer codes to simulated homogeneous deformation fields shows that the two methods provide similar results.

To study the effect of inhomogeneity of deformation in the obtained results, both approaches have been implemented to the GPS results of south-central Alaska, Kenai Peninsular. Crustal deformation in this area has been dominated by two major phenomena: the subduction of the Pacific Plate underneath the North American Plate and the Prince William Sounds Earthquake of 1964. The post-seismic deformation of this area as well as the mechanism which governing the deformation in this area has been thoroughly analyzed in several previous researches. The known features of crustal deformation in this area, obtained from these studies, serve as a bench mark for validating the results of the two methods. The instability of the Finite element solution in three-dimensions is also analyzed.