

Analysis of physical heights determination in local geodetic network

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Abstract: The contribution deals with precise determination of normal heights by Molodensky in local geodetic networks. Introduction to the theory of physical heights and methods for their numerical evaluation is supported by practical experiment, which was realized in local geodetic network PVE Ipel', where three different methods were applied: classical method, method using geopotential numbers and method using GNSS leveling. Solution considers different approaches to calculate free-air gravity anomalies and its further use in evaluating of gravity value at the points where it is not directly measured. Values of gravity anomalies were determined on the basis of two digital elevation models, which are also compared in this work. Our tests point out to the quality of the regional gravimetric database of Slovakia in respect of geodetic applications. Experiment demonstrates the highest precision of method using geopotential numbers, which are based on measured gravity and leveled elevations. The classical method is very similar by the results, but nowadays is practically obsolete. Despite of weaker results in comparison with previous methods, GNSS leveling verified reliability of used quasigeoid model.

Key words: physical heights, geopotential number, GNSS leveling, Bouguer anomaly, free-air anomaly

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