



Gravity field determination by GOCE accelerometer observations

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One of the core instruments of the GOCE mission is the gravity gradiometer. The instrument consists of six 3d accelerometers, which are mounted on three mutually orthogonal arms. The standard approach to determine the gravity field of the Earth from observations of this instrument is using a two step procedure. In a first step the gravity gradient tensor is determined by computing the pair wise differences of the accelerometer observations. These differences have to be corrected by the centrifugal force caused by the rotation of the satellite. In a second step the derived gravity gradients are used as pseudo observations in a least squares adjustment to estimate the stokes coefficients of the Earth's gravitational potential.

In this talk a new approach is presented which directly uses the observations of the three accelerometers to estimate the stokes coefficients, the angular rates, and the non-conservative forces in a combined adjustment. Within this approach it is also possible to estimate the instrument's imperfections e.g the accelerometer bias, scale factors, misalignments etc.

The new approach is discussed, first results are presented and are compared to official solutions.