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# The finite element method for the global gravity field modelling

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We present a finite element approach for solving the fixed gravimetric boundary-value problem on a global level. To that goal, we have defined the computational domain bounded by the real topography and a chosen satellite level. The boundary-value problem consists of the Laplace equation for the disturbing potential and the Neumann boundary condition given by the gravity disturbances applied on the bottom boundary, and the Dirichlet boundary condition given by the disturbing potential applied on the upper boundary. Afterwards, the computational domain is meshed with several different meshes chosen to avoid the problem of simple spherical meshes that contain a singularity at poles. Our aim has been to show how the right mesh can improve results as well as significantly reduce the computational time. The practical implementation has been done in the FEM software ANSYS using 3D linear elements SOLID70 and for solving the linear system of equations, the preconditioned conjugate gradients method has been chosen. The obtained disturbing potential has been applied to calculate the geopotential value W0.