



The effect of the point thermal source on measured geodetic parameters

M. Valko

Department of Theoretical Geodesy, Slovak University of Technology, Radlinskeho 11, 813 68 Bratislava, Slovak Republic

milos.valko@stuba.sk / Fax: +421 / 2 / 59274476 / Phone: +421 / 2 / 59274538

Let's consider the stationary point thermal source in a halfspace. The basic model of thermal influence on selected geodetic parameters is discussed here. Only the homogeneous and isotropic elastic halfspace was used in our numerical experiment.

The basic idea is to solve the corresponding differential equation for this type of the problem. In our case the analytical for the simple case was used. This solution describes the temperature field of the halfspace. Since this problem is axisymmetric it is convenient to solve it in the cylindrical coordinate system. The temperature field must satisfy the boundary condition on the plane $x_3 = 0$. From the temperature distribution we can determine the thermal stress and also the displacement vector. The displacement vector describes the motion of particular station due to the thermal effect.

The effect of the point thermal source on the geometric and physical parameters from the geodetic practice namely the heat flow, the vertical and horizontal displacement of grid point, the stress due to thermal effect, the change of continuum density, the change of gravity, the geoid undulations and the change of deflection of vertical is presented.