

The doctoral thesis deals with selected methods of spatial interpolation and their applications to numerical modeling of the earth's surface, in particular soil erosion.

The first part contains the description of the studied methods. Firstly and foremost, the method called regularized spline with tension (RST) is introduced. It has proven to be useful in interpolating elevation data. In the thesis, RST is presented in depth with the derivation of its radial basis function and its links to kriging. Further on the mathematics of digital terrain models and the tools for terrain geometric analysis are covered. The following chapter deals with the description of the soil erosion process and of the selected erosion models.

The second part of the thesis summarizes five of the author's research articles which include applications of the described mathematical methods. The first two articles are devoted to the problem of elevation data interpolation and the building of digital elevation models. They deal with the optimization of the RST method for particular input data and target erosion models. The third article analysis the spatial structure of the soil data and the pedogenesis of the Žofinský prales natural forest. The last two articles deal with the spatial properties of heavy rainfalls and the mapping of rainfall erosivity.