
MATHEMATICAL ESTIMATION OF WATERCOURSE BATHYMETRY – BATHY_SUPP SOFTWARE

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Keywords: airborne laser scanning – hydrodynamic model –
bathymetry – river channels – digital elevation model – floods

Topographic data play an important role in the hydrodynamic modelling of flood events. An accurate and precise digital elevation model (DEM) with a bathymetric description of the river channel is often required. DEMs can be derived from various data sources, e.g. ground surveying or remote sensing techniques. It is often costly and time-consuming to perform ground surveys, and especially to obtain geodetic data. Source data for DEM can also be obtained from satellites; however, these DEMs are insufficiently accurate for precise hydrodynamic modelling. Aerial laser scanning (ALS) appears to be the most appropriate method for obtaining relevant source data.

An infrared laser beam is widely used in the Czech Republic for collecting ALS data. A limitation on the use of this technology for the purposes of hydrodynamic modelling is that an infrared laser beam is absorbed by water. In practice, this means that there is a lack of precise and complete information on the topography of the streambed below the water level of the stream. A DEM created from ALS data results in a model that neglects the flow areas of the river channel.

Our study presents results from the development of the Bathy_supp software tool, which determines the bathymetry of natural river channels. The bathymetry is determined with the use of analytical curves describing the course of cross-sections. Subsequently, spatial interpolation among the estimated cross-sections is made, resulting in bathymetric point network. This bathymetric point network can be combined, for example, with ALS data to create a DEM suitable for hydrodynamic modelling. This paper presents a practical example of software tests on a study area. Bathy_supp software provides significantly better results than a terrain model created from ALS data.