Processing remote sensing data with artificial neural networks: filtration, stratification, finding key indices and filling gaps in data

A. Shchemel, Yu. Ivanova

Institute of Biophysics SB RAS, Krasnoyarsk, Russia

(amlux@yandex.ru / Fax: 7 3912-433400)

Choosing long-term optimal strategy of interaction between human and biosphere is impossible without developing mathematical simulations of biosphere processes which provide adequate prediction of climate dynamics. For verification such biosphere simulations is inevitable to use all available data of ground-based and remote sensing observations. Unfortunately, both types of data are often incomplete, there are lacunas considering spatial and time dimensions caused by various reasons. A set of computational tools based on fast methods of nonlinear multidimensional regression (that traditionally called artificial neural networks) was designed. With the help of this set is possible to solve problems of preprocessing remote sensing data – filtration, stratification, filling gaps and finding invariants or significant characteristics of big arrays of numerical information. In the frames of that work was developed software complex which allows revealing time and spatial global distribution of organic pigments along with characteristics of long-time trends of chlorophyll concentration in various biological and geographical conditions. Algorithms were not only coded as a stand-alone program but also implemented in computational complexes to achieve better portability and ability of parallel computation. In the paper samples of processing remote sensing data with considered set of programs are described.