# NONLINEAR FILTERING OF 1-SECOND GEOMAGNETIC FIELD RECORDS OF A VECTOR AND A SCALAR MAGNETOMETER ON THE BASIS OF LOCAL APPROXIMATION MODELS

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The problem and the algorithms of nonlinear filtering of 1-second data records of geomagnetic field registered by a vector and a scalar magnetometers are discussed in the study. The proposed nonlinear filtering is implemented for sequences of discrete records of magnetometers at local (short) time intervals. Local estimations of the coordinate functions of total magnetic intensity vectors are obtained, close to the initial coordinate functions.

The mathematical tool of local approximation parametric models is applied. For 1-second records these models are represented by the piecewise-constant, piecewise-linear and other functions. At local intervals, the local coordinate functions are assigned to these local models. Local functionals are formed for the records and the corresponding local models, and they determine the weighted sums of squares of the differences between magnetometer records and models at local intervals. The estimations for the coordinate functions are obtained using minimization of local functionals and calculation of optimal models.

The use of the non-linear filtering of geomagnetis records for 1-second discretization and combined processing of the data from two magnetometers can reduce the errors in the estimates of non-stationary geomagnetic disturbances in the ULF band ($\approx$1.0Hz-0.001Hz). Statistical modeling of the proposed algorithms of nonlinear filtering confirmed their effectiveness.