POLAR MOTION FORECAST USING COMBINATION OF AUTOCOVARIANCE PREDICTION AND KALMAN FILTER

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The accuracy of the combined pole coordinate data determined from the space techniques is of the order of 0.1 mas. In contrast, their prediction error for a few days in the future is usually several times greater. We propose here a new prediction algorithm based on a combination of autocovariance method developed by Kosek (2000) and the Kalman filter, which gives accuracy comparable to that achieved by the standard procedures applied currently by the IERS Rapid Service/Prediction Center. The first method is found to yield good results at low frequencies therefore is used to model the long period component of polar motion. For the short term prediction we applied the Kalman filter which gives considerably better results than the previous method. We demonstrate that inclusion of the stochastic model of the atmospheric angular momentum (AAM) function in the Kalman filter design, and adding the AAM data to the observation vector diminishes significantly the prediction error for a few days ahead. We also included in our tests the ocean angular momentum (OAM) model and data, which is an option for future application because so far the OAM data are not available in real time.