



## **A new hybrid method to improve EOP prediction**

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Earth orientation parameters (EOP) are needed for several fields and applications such as fundamental astronomical and geodetic reference systems, precise satellite orbit determination, and space navigation. For the analysis of space geodetic techniques in (near) real time predictions of the EOP are required. EOP are made available by International Earth Rotation and Reference System Service (IERS) Rapid Service Prediction Centre at USNO, Washington DC with a delay of hours. Accordingly, in the past several methods were developed and applied for the EOP prediction. However, the accuracy of EOP prediction is still not satisfactory even for prediction of just a few days in the future. New methods or a combination of the existing approaches can be investigated for improving the accuracy of the predicted EOP.

In this study, we investigate a new approach, based on the combination of a deterministic and a stochastic method to improve the polar motion (PM) and length of day (LOD) prediction. This method consists of a deterministic part estimated by SSA, whereas Copula is used for modeling the stochastic part.

Daily time-series of PM and LOD in this contribution are from IERS. The effective angular momentum (EAM) functions are provided by the Earth System Modeling group at Deutsches GeoForschungsZentrum Potsdam (ES-MGFZ). Our results show that the improvement in PM prediction accuracy up to 365 days in the future is found to be 40 % on average compared to the current PM prediction method. Also, the comparison with results of other methods indicates that the Copula + SSA can efficiently and precisely predict the LOD parameter at ultra-short term.