



## **Application of temporal disaggregation models for generation of monthly natural river flow**

**1 E. Bojilova**

National Institute of Meteorology and Hydrology – Bulgarian Academy of Sciences, Sofia, Bulgaria (Elena.Bojilova@dir.bg / Fax: +3592 988 44 94)

- 1.1 Stochastic modelling is an important tool in design and operation of water resource systems. The recent research has been done to apply selected temporal disaggregation models for data generation. The objects for disaggregation are stations with recovered natural river flows in drainage basin of Osam River in Bulgaria. Osam River is one of the tributaries of Danube River in Bulgarian territory. As a result synthetic flow sequences with monthly values are generated.**
- 1.2 It is possible to distinguish three main groups of disaggregation models in a temporal, spatial and temporal-spatial domain. The focus of the presented research is application of temporal models for disaggregation of annual flow totals to monthly flows. The aim of the research is to test applicability of the models for specific climatic, hydrological and orographical conditions in Bulgaria.**
- 1.3 Two basic models are executed - the Original extended model of Mejia and Rousselle and the Corrected extended Lin model, one-stage disaggregation. Data from five stations along the Osam River located in North Bulgaria are executed. The comparison between the two applied models is made. The Lin model is an improvement to the original extended model. Due to better performance Lin model single-site is selected for generation of synthetic series.**

Concluding remarks:

- The corrected parameter estimation in the Lin model succeeded in preservation of the additivity and the covariance matrices. The corrected Lin model is an improvement compared to the extended Mejia and Rousselle model.
- The Lin model preserves the first two statistical moments (mean and variance) and the covariance matrices rather well.
- The models are suitable for disaggregation of the recovered natural river flows

with combined recharge conditions (snowmelt and/or rainfall) in the catchment areas. They are applicable for the specific climatic, hydrological and orographical conditions in Bulgaria.

- Both models are suitable for the specific conditions in the hilly and valley regions in the country. They were tested for drainage basins with small, medium and relatively large for Bulgaria sizes.
- The better performance was obtained from the corrected extended Lin model, one-stage disaggregation.

**Keywords:** stochastic and disaggregation modeling, recovered natural river flow.