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Water Stage Forecasting of Reservoir during High Water Using EEMD

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Reservoir operation is affected by many hydrological factors. Inflow of reservoir is the most important factors. Therefore the operation of reservoir during high water relies on the information of water stage of rivers. During high water, two of the most important factors affecting water stages in streams and reservoir are rainfall and characteristics of reservoir. However the hydrological processes in streams during high water are nonlinear and nonstationary. Generally the conventional methods used for forecasting water stages in front of dam are very complicated. However the accurately forecasting water stages of reservoir, especially during high water, is very important for the operation of reservoir. The study makes used of Ensemble Empirical Mode Decomposition (EEMD) to analyze the water stages in streams and reservoir. One of the advantages of the EEMD is it can be used to analyze the nonlinear and nonstationary data. The EEMD divides the water stage into several intrinsic mode functions (IMFs) and a residual; meanwhile, the physical meaning still remains during the process. By comparing the variation of IMF, it is possible to identify if the IMF of water stage in reservoir is affected by the IMF of water stage in streams. Finally the stepwise regression is used to establish the relation of IMFs of reservoir and streams. This study will analyze the data collected by the Taipei Feitsui Reservoir Administration to establish the water forecasting model. It includes the water stages in front of the dam and in the streams for assess the feasibility of applying the EEMD to forecast the water stages in the reservoir during high water.