River Stage-Discharge Forecasting Based on Multiple-Gauge Strategy Using EEMD-DWT-LSSVM Approach

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Abstract : This study presented hybrid pre-processing approach along with a conceptual model to enhance the accuracy of river discharge prediction. In order to achieve this goal, Ensemble Empirical Mode Decomposition algorithm (EEMD), Discrete Wavelet Transform (DWT) and Mutual Information (MI) were employed as a hybrid pre-processing approach conjugated to Least Square Support Vector Machine (LSSVM). A conceptual strategy namely multi-station model was developed to forecast the Souris River discharge more accurately. The strategy used herein was capable of covering uncertainties and complexities of river discharge modeling. DWT and EEMD was coupled, and the feature selection was performed for decomposed sub-series using MI to be employed in multi-station model. In the proposed feature selection method, some useless sub-series were omitted to achieve better performance. Results approved efficiency of the proposed DWT-EEMD-MI approach to improve accuracy of multi-station modeling strategies.

Keywords : river stage-discharge process, LSSVM, discrete wavelet transform, Ensemble Empirical Decomposition Mode, multi-station modeling

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