Evapotranspiration prediction using system identification and genetic algorithm

Abstract

Reference evapotranspiration or ETO is important to provide information in planning and management of water resource system for irrigation purposes. Hence, its accurate estimation is of vital importance to assess water availability and requirements. This study explores the use of system identification approach and modified genetic algorithm (MGA) to model the evapotranspiration process under climatic data. The method is applied in modelling hourly evapotranspiration in central and southern region of Malaysia as a function of solar radiation, temperature, humidity and wind speed. The performance of the model is compared with the traditional Penman-Monteith (PM) method. Results from the study indicate that both the data driven is comparable with that of the PM method. The MGA models are dominated by temperature and solar radiation indicating that these two inputs can represent most of the variance. The results also show that the models are parsimonious and understandable, and are well suited to modelling the dynamics of the evapotranspiration process.