ABSTRACT:

The tank model, a lumped conceptual hydrological model, is well known due to its simplicity of concept, simplicity in computation while achieving forecasting accuracy comparable with more sophisticated models. However, the calibration of the hydrologic tank model required much time and effort to obtain better results through trial and error method. With the development of artificial intelligence, three probabilistic Global Optimization methods namely Genetic Algorithm (GA), Shuffle Complex Evolution (SCE) and Particle Swarm Optimization (PSO) were adopted for model calibration. The objective of the study is to find the best type of Global Optimization Methods and the best configuration to calibrate tank model that will produce the best fit between the observed and simulated runoff. The selected study area is Bedup Basin, located at Samarahan Division, Sarawak. Input data used for model calibration is a single storm event. The optimal parameters obtained will then be validated with 11 other single storm events. The performance of the optimization techniques is measured using Coefficient of Correlation (R) and Nash-Sutcliffe coefficient (E_2). Results show that all three probabilitic GOMs are able to obtain optimal value for 10 parameters of tank model. However, the best GOMs for hourly runoff simulation is PSO. SCE appeard to be the second best performance GOMs and the least performed is GA technique.