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Using automatic calibration method for optimizing the performance of Pedotransfer functions of saturated hydraulic conductivity

Ahmed M. Abdelbaki

Fayoum University, Faculty of Engineering, Fayoum, Egypt

ABSTRACT

Pedotransfer functions (PTFs) are an easy way to predict saturated hydraulic conductivity(Ksat) without measurements. This study aims to auto calibrate 22 PTFs. The PTFs were dividedinto three groups according to its input requirements and the shuffled complex evolution algorithmwas used in calibration. The results showed great modification in the performance of the functionscompared to the original published functions. For group 1 PTFs, the geometric mean error ratio(GMER) and the geometric standard deviation of error ratio (GSDER) values were modified fromrange (1.27–6.09), (5.2–7.01) to (0.91–1.15), (4.88–5.85) respectively. For group 2 PTFs, the GMERand the GSDER values were modified from (0.3–1.55), (5.9–12.38) to (1.00–1.03), (5.5–5.9) respectively.For group 3 PTFs, the GMER and the GSDER values were modified from (0.11–2.06),(5.55–16.42) to (0.82–1.01), (5.1–6.17) respectively. The result showed that the automatic calibrationis an efficient and accurate method to enhance the performance of the PTFs.