1. **Estimation of Manning's Roughness Coefficient for Al- Diwaniya River**

**ABSTRACT**

An accurate estimation of Manning's roughness coefficient is of vital importance in any hydraulic study including open channel flow. There are empirical methods to estimate the values of roughness however these methods are often applicable to a narrow range of river conditions. In the present study, field work, laboratory work and an intelligent method based on Adaptive Neuro- Fuzzy Inference System ANFIS approach model are applied to Al- Diwaniya river as a case study to estimate the values of Manning's coefficient through direct method using discharge, particle size, hydraulic radius, and slope of river. The data are measured in the field (river) for the period from 1/11/2013 to 28/2/2014 and divided randomly into two sets; the first set is for training purposes; the second set is for testing purposes. Statistic measurements are then used to evaluate the performance of the models. Based on the comparison of the results, it is well found that the ANFIS model presented better estimation than the other empirical relationships considered here. Also, a sensitivity analysis showed that d90 has greater influence on Manning coefficient than the other independent parameters in ANFIS model.