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Geographic Space

An Approved Scientific, Research-based

***Fariba Zareh Amini*[1]**
***Mohammad Ali Ghorbani*[2]**
***Sabereh Darbandi*[3]**

Evaluation of Genetic Programming in Estimation of Soil Temperature

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Abstract

Soil temperature is one of the most important parameters in the hydrological processes and agricultural studies that it is essential for the measurement and estimation;so far various methods is used to estimate of soil temperature such as regression models and artificial neural network. In the present study in addition to the artificial neural network model,the first time applied genetic programming method are used in estimating soil temperature at various depths in Synoptic stations of Tabriz as a new method of heuristic techniques that able to provide a explicit relationship between

1 - MSc Student, Azad university,Tabriz, Iran.
2 -Associate and Assistant Prof., Water Enginnering Department, University of Tabriz, Iran.
3 -Associate and Assistant Prof., Water Enginnering Department, University of Tabriz, Iran.

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the dependent and independent variables. Important meteorological parameters such as average air temperature, precipitation, relative humidity and wind speed were selected as factors affecting soil temperature at various depths in the 18-year period (1371-1388). Then for evaluate of accuracy each of the mentioned methods, first, was constitution of different combinations of soil temperature values and were used as inputs to these models, likewise in the next step was selected different combinations of various meteorological parameters with delayed by one day as input of model and soil temperature as the output of model.

Both models are able to estimate the acceptable temperature at different depths considering the statistical indices and the scatter diagrams.Also were presented the explicit solutions that reflect the relationship between input and output variables, based on genetic programming, which were given priority on the genetic programming model adds another.

Keywords: Artificial neural network, Genetic programming, Heuristic, Soil temperature,Tabriz...

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