



Prediction of environmental indicators in land leveling using artificial intelligence techniques

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Abstract:

Land leveling is one of the most important steps in soil preparation and cultivation. Although land leveling with machines require considerable amount of energy, it delivers a suitable surface slope with minimal deterioration of the soil and damage to plants and other organisms in the soil. Notwithstanding, researchers during recent years have tried to reduce fossil fuel consumption and its deleterious side effects using new techniques such as; Artificial Neural Network (ANN), Imperialist Competitive Algorithm -ANN (ICA-ANN), and regression and Adaptive Neuro-Fuzzy Inference System (ANFIS) and Sensitivity Analysis that will lead to a noticeable improvement in the environment. In this research effects of various soil properties such as Embankment Volume, Soil Compressibility Factor, Specific Gravity, Moisture Content, Slope, Sand Percent, and Soil Swelling Index in energy consumption were investigated. The study was consisted of 90 samples were collected from 3 different regions. The grid size was set 20 m in 20 m (20*20) from a farmland in Karaj province of Iran. The aim of this work was to determine best linear model Adaptive Neuro-Fuzzy Inference System (ANFIS) and Sensitivity Analysis in order to predict the energy consumption for land leveling. According to the results of Sensitivity Analysis, only three parameters; Density, Soil Compressibility Factor and, Embankment Volume Index had significant effect on fuel consumption. According to the results of regression, only three parameters; Slope, Cut-Fill Volume (V) and, Soil Swelling Index (SSI) had significant effect on energy consumption.

Biography:

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Publication of speakers:

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3. Alzoubi, Isham & Delavar, Mahmoud & Mirzaei, Farhad & Arrabi, Babak. (2018). Prediction of environmental indicators in land leveling using artificial intelligence techniques. Journal of Environmental Health Science and Engineering. 16. 10.1007/s40201-018-0297-3.
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