Optimization of energy consumption in land leveling using GIS, genetic and pso (particle swarm optimization) algorithms

Isham Alzoub

University of Tehran, Tehran, Iran

Abstract

One of the most important steps to prepare soil is land leveling. Land leveling with machines require considerable energy. To increase the accuracy of the calculations, the point height collected from mapping (50 m × 50 m) insert into the GIS environment. rest of the unknown coordinates were obtained using interpolation and a triangular network model (TIN) was used to determine the exact volume of earthworks. In all methods, the equation of the leveling plate, excavation and embankment volumes and maps of land surface after leveling, separation of excavation and embankment and the energy consumption including power of the machine, fuel and manpower were calculated then different methods were compared. The results showed that the ratio of excavation to embankment based on the methods of minimum least squares, genetic algorithm, linear algorithm for optimizing of the particle motions, the particle motion curve algorithm are equal to 1.26, 1.14, 1.12, and 1.16, respectively. On the other hands, the results showed that the method of the particle motion curve algorithm has been shown a 45% reduction in energy consumption in the leveling operation relative to the method of minimum least squares. The genetic algorithm can reduce energy consumption by 42 percent. Between the models used in the method of genetic algorithm, model No. 1 has been estimated that the largest portion of energy consumption is relevant to the fuel (up to 71.83 percent) and the lowest portion of energy consumption is relevant to the manpower (up to 0.38 percent). Therefore, the present study recommends the model of plate-curve genetic algorithm as the best

model

Biography:

Iesham alzoubi has completed his PhD at the age of 27 years from Doctor of Philosophy Degree in Agricultural Mechanization Engineering (University of Tehran – Iran) University and Postdoctoral Studies from School of Surveying Geospatial Engineering-Department of Surveying and Geomatics Engineering, University of Tehran . Current Job: General commission for scientific Agricultural Research – Damascus – Syria (Mechanical Engineer) He has published more than 16 papers in reputed journals and has been serving as an editorial board member of repute.

Speaker Publications:

1. Mirzaei, F., Delavar, M. R., Alzoubi,I&Nadjar Arrabi, B. (2017).Modeling and prefect environmental indicators for land leveling, using ANFIS and regression. International Journal of Energy Sector Management. 12(4)
2. alzoubi,I., sheikh davodi,M.J., bahrami,H., afzalii,M., (2013).Effect of tillage method, planter type and its travel speed on quality indices in maize seeding. Journal of Researches in Mechanics of Agricultural Machinery .
3. alzoubi,I., Rajabipor,A., Ahmadi,H., Mirzaei,F.,(2015) Optimization of Land Leveling Operations through Least Square Method and Its Comparison with the Genetic Algorithm and Particle Swarm Optimization Algorithm. IRANIAN JOUNAL OF BIOSYSTEM ENGINEERINHG.45:105-112.
4. Alzoubi, I., Delavar, M., Mirzaei, F., &Nadjar Arrabi, B. (2017).Integrating artificial neural network and imperialist competitive algorithm (ICA), to predict the energy consumption for land leveling. International Journal of Energy Sector Management. doi.org/10.1108/IJESM-01-2017-0003
5. Alzoubi, I., Delavar, M., Mirzaei, F., &NadjarArrabi, B. (2017). Application of Sensitivity analysis, and ANFIS and ANN models in prediction of environmental indicators for land leveling. Agricultural Engineering International: CIGR Journal

10th European Chemistry Congress;
Vienna, Austria- July 15-16, 2020.

Abstract Citation:

Isham Alzoub, Optimization of energy consumption in land leveling using GIS, genetic and pso (particle swarm optimization) algorithms, Euro Chemistry 2020, 10th European Chemistry Congress; Vienna, Austria- July 15-16, 2020.. (https://europe.chemistryconferences.org/abstract/2020/optimization-of-energy-consumption-in-land-leveling-using-gis-genetic-and-pso-particle-swarm-optimization-algorithms)