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Abstract

In this paper, an efficient irrigation system is proposed based on computing evapotranspiration (ET) and the required irrigation quantity using fuzzy inference methodology. The aim of this system is to schedule irrigation according to the particular requirements of a crop and to the change in various climatological parameters and other factors. This is to avoid over- or under-watering which significantly affects the crop quality and yields using the proposed algorithm. Moreover, our algorithm reduces the power switching, hence it conserves energy. The results demonstrate that the fuzzy model is a quick and accurate tool for calculating evapotranspiration as well as the required net irrigation. Besides, no water stress occurs because our model prohibits depletion in soil moisture from reaching 100% which represents permanent wilting point. Since, irrigation always starts when depletion ratio reaches 50% of total available soil moisture. Additionally, we introduce a general algorithm as a part of the proposed system to calculate the irrigation time, which well suits both micro-irrigation methods: sprinkler and drip irrigation.

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Index Terms

Computer Science

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Keywords

Deficit irrigation evapotranspiration FIS fuzzy Matlab.