

EC-5土壤水分传感器温度影响机理及补偿方法研究 Temperature Effect Mechanism and Compensation Method of EC-5 Soil Moisture Sensor

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关键词: 土壤介电常数 土壤水分传感器 最小二乘支持向量机 温度补偿

摘要: 针对EC-5传感器温度实验中出现的两种截然不同现象,根据温度对土壤介电常数和电导率影响的机理分析,建立土壤水分传感器测试结果随温度变化的理论模型。通过对模型的仿真分析发现,EC-5传感器测得的土壤水分含量随温度变化的趋势与土壤电导率密切相关。利用最小二乘支持向量机对传感器的温度实验数据建立补偿函数并提出相应补偿算法,有效地抵消了温度变化造成的传感器测试误差。 Aiming at the two distinct phenomena appeared in the EC-5 sensor temperature experiment, a theoretical model on variation of soil moisture content with temperature was established according to the influence of temperature on soil permittivity and electrical conductivity. The simulation based on the model shows that the variation tendency of soil moisture content with temperature measured by the EC-5 sensor is closely related to the soil electrical conductivity. Using least squares support vector machine, the sensor temperature compensation function was built and corresponding compensation algorithm was proposed. The results of the experiment indicate that the sensor measurement errors caused by temperature are effectively offset.

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