

## 基于CFD技术的玻璃温室加热环境数值模拟

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摘要: 提出采用CFD技术数值模拟温室热风供热条件下的温度环境三维场分布。采用标准k- $\epsilon$ 湍流模型和PSIO算法的有限体积法对流场微分方程进行离散, 并考虑辐射模型, 选择Fluent软件进行温室加热环境的模拟与仿真。通过在Venlo型玻璃温室中试验现场采集关键点温度数据, 与仿真结果比较的均方根误差为0.67K, 且在温室内温度场的总体趋势是一致的。验证了建立CFD模型的正确性, 以及采用Fluent软件进行夜间热风加热条件下的温室热环境数值分析是可行的。The modeling method of the temperature distribution in glass greenhouse with forced-air heater based on the CFD technique was proposed. The flow regime proved to be turbulent and it was modeled by using the standard k- $\epsilon$  turbulence model, and the non-gray DO model of radiation model was also applied. The numerical solution was made by applying a finite volume discretization code with the pressure implicit with splitting of operators (PISO) algorithm. The temperature data of the key position were collected in a three-span Venlo glasshouse. By using the root mean squares error (RMSE) algorithm, the error between simulated value in Fluent and measured value was simulated and analyzed. The results indicate that the CFD-based model can provide reliable estimation of the temperature distribution in the greenhouse during the forced-air heater working.

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