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基于图像处理及模式聚类的二次仿真方法及其在回转窑温度监控中的应用

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摘 要：提出一种基于图像处理和模式聚类的二次仿真方法。应用Fluent商业软件对回转窑内粉煤在27类设定工况的燃烧进行温度场的三维数值模拟，将仿真结果构建仿真结果数据库；采用模式聚类的方法判断实际工况属于哪一类标准工况，调用仿真结果数据库建立温度与该类标准工况的数学模型，求解模型并计算实际工况下的温度场；利用图像处理中的伪彩色变换得到二次仿真结果，用VC++6.0来实现。结果表明：该方法能够较准确地给出仿真结果，极大缩短计算时间，为回转窑内温度监测提供一种新思路，具有较大的现场应用价值，并很容易推广到其他领域中。

关键字： 二次仿真；模式聚类；图像处理；Fluent数值模拟；回转窑

Secondary simulation based on pattern cluster and image process and application in rotary kiln temperature inspection

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Abstract:A secondary simulation method based on pattern recognition and image process was proposed. First, 3 dimensional numerical simulation of the powered coal combustion in rotary kiln was made under the 27 setting states by Fluent software, and the simulation results were constructed into a database; then, decide which class the actual state belongs to through pattern recognitions, get the simulation result of this class from database and build the mathematical model between the simulation result and input parameter, resolve the model and calculate the actual simulation result; at last, achieve the graphical simulation result by image process. The interface is realized using VC++6.0 program language. The experiments show that this method can get satisfactory simulation result in very short time, which provides a new way for the temperature inspection of rotary kiln and can be easily expanded to other field.

Key words: secondary simulation; pattern recognition; image process; Fluent numerical simulation; rotary kiln

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