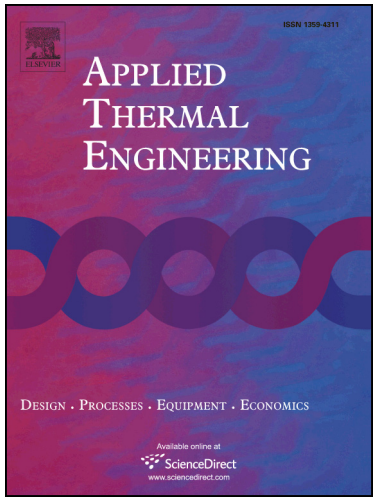

Research Paper

Energy and carbon emissions analysis and prediction of complex petrochemical systems based on an improved extreme learning machine integrated interpretative structural model

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Energy and carbon emissions analysis and prediction of complex petrochemical systems based on an improved extreme learning machine integrated interpretative structural model

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Abstract: Energy saving and carbon emissions reduction of the petrochemical industry are affected by many factors. Thus, it is difficult to analyze and optimize the energy of complex petrochemical systems accurately. This paper proposes an energy and carbon emissions analysis and prediction approach based on an improved extreme learning machine (ELM) integrated interpretative structural model (ISM) (ISM-ELM). ISM based the partial correlation coefficient is utilized to analyze key parameters that affect the energy and carbon emissions of the complex petrochemical system, and can denoise and reduce dimensions of data to decrease the training time and errors of the ELM prediction model. Meanwhile, in terms of the model accuracy and the training time, the robustness and effectiveness of the ISM-ELM model are better than the ELM through standard data sets from the University of California Irvine (UCI)

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