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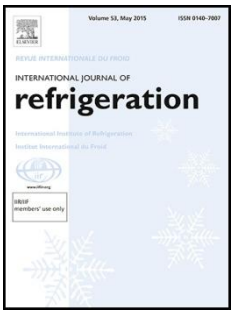

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A general simulation model for variable refrigerant flow multi-split air conditioning system based on graph theory

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Highlights

- General model of multi-split air conditioners was developed based on graph theory.
- Description method of system layout and indoor unit operating number was developed.
- A tailor-made solution algorithm to solve the model was developed.
- Experimental validation of the proposed model was performed.

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Abstract

For predicting the performance of variable refrigerant flow multi-split air conditioning (VRF) systems with arbitrary layouts under various operating conditions, a general simulation model for VRF systems based on graph theory was proposed. In the present study, the directed graphs and adjacent matrixes were established to describe the systems with arbitrary layouts under cooling and heating modes, and a diagonal matrix was developed to describe the operating number of indoor units; the general description matrix of VRF systems under various operating conditions was expressed as the multiplication of the adjacent matrixes and the diagonal matrix. The component models meeting the simulation accuracy requirement were presented. A tailor-made iteration algorithm using graph-based traversal method was developed to solve the system model. The proposed simulation model for VRF

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