Evaluation of Intelligent Controllers for Improving Elevator Energy Efficiency

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Abstract

In recent years, conservation of energy without degradation in performance has become a major trend in the transportation sector. In this paper, authors developed an algorithm to achieve notable energy savings in elevator systems. Elevator operations have two modes: running mode and stand-by mode. Design of an energy-saving elevator system capable of manipulating its speed in running mode is proposed. Speed is varied based on the load carried and acceleration is varied based on the number of floors traveled. The total travel time of the system is examined in the context of enhancing overall performance. The algorithm is tested with various traffic patterns: 1) Non-peak hours and 2) Peak hours. Simulated performance is compared with that of constant speed elevators. This method produces a 12.35% energy savings and 5.49% reduction in travel time during non-peak hours and 5.06% energy savings and 1.32% reduction in travel time during peak hours of traffic.

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