Optimal Configuration Design: An Integrated Approach Using Grammars

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ABSTRACT

A computational approach to design that integrates conceptual design, configuration design, and component selection tasks overcomes some of the barriers to successful design automation. FFREADA is an implementation of a general design generation and optimization algorithm featuring hierarchical ordering of grammar based-design generation processes at different levels of abstraction. FFREADA is used to generate near-optimal hand-held power drill trains in a space which exceeding 200 million designs that are not limited to any particular functional architecture or component configuration. Drill power train designs within 1 percent of the optimal solution are found in minutes by sampling 302,000 design states on average. Optimal configurations are found for drills with three different torque requirements.

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