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Optimization of the Topology and Sizing of Two-dimensional Steel Frame Structures to Minimize Cost

Stanford researchers have created software to facilitate the design of 2D steel truss and frame structures for buildings and civil infrastructure.The software helps with the optimization of topology and sizing design for these structures to minimize the total installed cost. The software would need further development for commercial use.

Advantages

- Conventional structural design practice is to manually generate different structural topology and sizing alternatives in order to identify a design solution that satisfies project objectives and constraints. This invention improves on conventional methods in the following ways: - Reduction in design time / cost by significantly reducing design cycle time through automation. - Improved design reliability / safety by reducing the likelihood of manual calculation errors. - Identification of lower cost design solutions by leveraging computing to systematically evaluate orders of magnitude more design alternatives that possible using conventional methods. Significant academic research has been done in the area of computation structural optimization, however, there is very little adoption of these methods in industry practice. This invention improves on existing computational optimization methods by providing a more accurate estimate of total installed cost and incorporating key constructability criteria.

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