Abstract:

Enterprises have to deal with increasing complexity of product, process and organizational structures e.g. resulting from changing market situations, product diversification, or the increase of domains in product design. Common methods that apply dynamic graphs and design structure matrices (DSMs) are limited to the identification, visualization, and analysis of existing structures. Evolutionary algorithms (EA) have been occasionally used to rearrange DSMs, i.e. to support the identification of relevant substructures. However, they represent a recognized approach for structural optimization. The objective of the presented research is to determine change scenarios that result in the best optimization at the lowest expense. This paper describes the conceptual design of an adequate evolutionary algorithm, its implementation in a prototypic tool, and the verification by optimizing a product structure from industrial practice.

Stichworte:

- structural optimization;
- evolutionary algorithms;
- evolutionary computations;
- design structure matrix; DSM;
- Controlling complexity

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