Abstract: Spaces. They are sets of good designs that reach by definition all design goals. Considering sets rather than one single design allows for unintended variations of component properties that are typical in the early stages of systems design. Box-shaped Solution Spaces can be expressed as the Cartesian product of permissible intervals for design variables. These intervals serve as independent target regions and can be interpreted as component requirements. Existing algorithms optimize the size of box-shaped Solution Spaces. Unfortunately, the size of the permissible intervals for crucial design variables is often not large enough to encompass all uncertainty and to ensure feasibility. A new approach is introduced where the design variables are divided into a set of early- and a set of late-decision variables. Early-decision variables are associated with permissible intervals on which they may assume any value to encompass uncertainty due to limited controllability. Late-decision variables are controllable and therefore associated with intervals where they can be adjusted to any specific value. The Cartesian product of these intervals is
called a Solution-Compensation Space. It has the property that for all values of early-decision variables from their permissible intervals there exists at least one set of late-decision variable values from their intervals such that the resulting design reaches all design goals. The approach is applied to a design problem from vehicle driving dynamics. It is shown that the permissible intervals for the early-design variables can be increased significantly.

Stichworte:
- lack of knowledge
- decision under uncertainty
- solution space
- flexible design
- early phase development
- driving dynamics

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