Abstract:

Pneumatic control systems are built using various types of valves of which each single one is to meet specific constraints given by the environment a brake system is operated in. In the perspective of a manufacturer of pneumatic appliances this results in a high number of product variants, while each variant requires several product versions. Complexity of product range inflicted by e.g. functional requirements might increase with the growth of a company, if the products of absorbed enterprises are retained and employed as a basis for new developments as well as the firm’s original products. Thus the aim of the approach presented in this paper is the identification of highly similar or even redundant products and the design of standardized components in order to facilitate the development process and to reduce current manufacturing costs. Thereby the approach should give the means to determine what has to be standardized and optimized in product architectures and how external and internal constraints should be taken into consideration. By the use of functional modelling the products embodying physical solutions of identical function structures are recognized. Further the function structures
of all product types are compared with the objective of discovering identical substructures. By the analysis of substructures, contradictory as well as consistent ones, standardized patterns and problem statements can be derived. Finally standardized designs can be defined for each problem statement to form a construction kit to be used over all product variants.

**Stichworte:**
product variety; functional modelling; product architecture; problem statements

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