Cycles in the multiple-domain matrix - Interpretation and applications

Abstract:
The design structure matrix (DSM) and the domain mapping matrix (DMM) are well established methods for dealing with complex systems and situations. However, they only allow for a limited view on a certain problem. To manage even more complex systems the multiple-domain matrix (MDM) which comprises DSM and DMM methods was developed. The MDM represents the basic structure of a complex system and defines the problem domains and their relations. The MDM structure can be modeled as a DSM like any other structure of relations. Thus the MDM itself forms a very abstract form of a DSM but so far no analysis of the MDM with DSM methods has been discussed. In this paper we discuss the structural properties of DSMs and MDMs and show that DSM methods can be applied to the MDM. First, the structural properties of the DSM, the DMM, and the MDM are compared. Next we apply the cycle analysis of the DSM to the MDM. After that we will show that cycles can interpreted as formulas which compute new DSMs. Finally, we verify our results with an example taken from.

Stichworte:
DSM; MDM; graph theory; structural analyses; deduction of indirect dependencies
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