

论文

一种改进的产品设计耦合活动迭代模型

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摘要:

质量、成本和时间三要素在产品开发过程中是相互影响相互制约的,不能片面追求某一方面.在产品阶段,这三要素关系更是复杂,主要是因为设计过程自身存在大量的耦合活动,导致设计过程重复.因此,如何模拟设计迭代过程在满足设计资源许可的前提下平衡设计三要素已成为当前研究的一个重点.建立在工作转移矩阵(WTM)基础上的分析模型(M-WTM),分析设计活动间的相互依赖关系,模拟、评价迭代设计过程,根据设计资源许可条件,实现完全串行、完全并行和混合三种方式进行产品设计迭代.型钢产品开发设计过程的模拟仿真,验证了该模型的有效性.

关键词: 产品迭代设计 混合迭代 M-WTM模型

An improved iteration model for coupled activities in product design

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Abstract:

The three determinants for a successful product development are higher quality, lower cost and shorter time-to-market. These determinants interact with each other in the whole process of product design and the emphasis on any one of them will induce the cost of others. The needed balance among them is extremely complex, especially in the design process, which is a major part of the product development processes. The primary problems lie in that a design process inherently contains a number of coupling activities, which imply potential iteration of the process. Hence, how to model the design iterations and seek the balance on allocating limited resources to facilitate each of the three determinants for an iterative design process has become one focus of recent research. An analytical model (M-WTM) is presented for modeling design iterations and providing estimates in terms of time, costs, and resources by dint of detailed analysis of the interrelationship among design activities, which is based on the work transformation matrix (WTM). According to the resources, this model will tackle purely sequential iteration, purely parallel iteration or mixed iteration. A complicated example, profiled bar product development design, was employed to illustrate the effectiveness of M-WTM.

Keywords: product design iteration mixed iteration M-WTM model

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