EngOpt2018 - 6th International Conference on Engineering Optimization
Instituto Superior Técnico, Lisbon Portugal • 17-19 September, 2018
Editors: H.C. Rodrigues, J. Herskovits, C.M. Mota Soares, et al.

Abstract ID 1105

OPTIMIZATION OF OBJECT-RELATIONAL DATABASE STRUCTURE

Ainars Auzins, Janis Eiduks

Riga Technical University, Latvia
ainars.auzins@rtu.lv, zane_matematika@inbox.lv

Keywords: object-relational database,structure optimization,multicriterial optimization

Abstract: Object-relational database is a hybrid solution. During its constructing (physical projection), problems are caused by three factors: ambiguity of transformations of conceptual model, multiplicity of criteria in quality assessment, and a lack of constructive model. The authors of various engineering developments have tried to understand the existing problems deeper and to offer their solutions. Object-relational database structure S is formed by basic containers Ki i=1,...,k (object, relational, XML tables) , data objects Oj j=1,...,z, object methods Mr r=1,...,m, object linking mechanisms Rt t=1,...,h, constraints Cl l=1,...,g and object types hierarchies components Ht t=1,...,u. The designer of a database must examine and assess a large variety of various potential solutions. The following database structure optimisation problem must be formulated and solved. The object-relational database structure S(K, O, M, R, C, H) needs to be optimized in admissible variation space G of database structures. With the variation of these structural elements, it is possible to obtain various object-relational database solutions with different qualities. For the automation of this process, a constructive structure model is necessary that can be used in software. XML language is used for such model development. The experience in the optimisation of topologies and forms has revealed the disadvantages of parametric optimisation in the operation with structures. There is the analysis provided of a set of parameters rather than the structure. In many cases it is not the same. It is necessary that structure S variation space Ω is created by possible structures rather than their parametric models. When moving in this space from one structure to the next structure, there would be the structures and not their parametric models analysed. It would permit better use of both formal and informal assessments. It is necessary to define structure variation space Ω to see it. For this in work is used Transformation rules database. Various algorithms and approaches have been developed for solving multicriterial optimisation problem. The most corresponding approach to design processes is adaptive or interactive approach. Sequential, directed analysis of database structures is performed in dialogue regime. At the end of each iteration, the designer provides the structure assessment and wishes. A great deal is being devoted to the effective presentation of different type of sub results (graphical and values) to the database designer (decision maker).