

REFINEMENT STRATEGIES FOR 4D REGULAR DOMAINS

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Abstract. The paper is devoted to various refinement strategies in the 4D Euclidean space. The red refinement strategy (RRS) have been widely used by researchers applying multigrid methods. This refinement method has a lot of advantages but it is not superior with respect to the degeneracy measure in the case of 3D quasi canonical domains, 3D ideal domains, 4D canonical domains and curved nonconvex domains. The RRS is compared with other subdivision methods for dividing ideal domains in the 4D Euclidean space. It is established that the RRS is superior than all other methods considered for all ideal domains.

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1. Introduction

The development of the multi-dimensional Euclidean geometry during recent decades is directly related to new results in the finite element methods and computer graphic applications [4, 5, 7, 12, 13]. The creating of applicable successive triangulations requires to assure the lowest measure of degeneracy and as small as possible number of congruence classes. Properties of multi-dimensional simplicial triangulations are established by Brandts et al. [3], Brandts and Křížek [2] and Korotov and Křížek [6]. The role of some specific polytopes is described by Nawratil and Pottmann [8]. Tóth *et al* [11] have introduced a refinement strategy in n -dimensional spaces by overlapping regular simplices. The latter increases the interest in the refinement of regular pentatopes.