Povzetek

Subdivizija je metoda v računalniški grafiki za modeliranje gladkih krivulj in ploskev. Subdivizijske ploskve se pojavljajo predvsem za konstrukcijo likov v risankah in računalniških igrah. Osnovna naloga je, da iz začetne kontrolne mreže z rekurzivnim postopkom v limiti sproduciramo gladko ploskev. Najbolj osnovne subdivizijske sheme za konstrukcijo ploskev na regularni mreži v limiti producirajo ploskve zlepkov. K lažjemu razumevanju subdivizijskih ploskev pripomorejo subdivizijske krivulje, saj so nekateri algoritmi za ploskve kar razširitve primerov za krivulje. Dve taki shemi za krivulje sta Chaikinov algoritem in 4-točkovna interpolacijska shema.

V diplomskem delu so podane osnovne ideje subdivizije ter predstavljene štiri sheme za ploskve, to so Catmull-Clarkova, Loopova, Doo-Sabinova ter shema Modificiran metuljček. Poudarek je na Catmull-Clarkovi shemi, ki temelji na bikubičnih B-zlepkih.

Abstract

Subdivision is a method in computer graphics to model a smooth curve or a surface. It is mainly used for construction of characters in cartoons and in computer games. Subdivision surface is a recursive process which starts with the initial control mesh and in the limit produces a smooth surface. In case of a regular mesh the limit surface for most of known schemes is just a spline surface. The idea of the subdivision can be extended from curves to surfaces. Two examples of a curve case with the extension to surface are Chaikin's algorithm and 4-point interpolating scheme.

The aim of this work is to give basic ideas of subdivision and to present four subdivision schemes for surfaces, which are Catmull-Clark, Loop, Doo-Sabin and Modified butterfly scheme. The main focus is on Catmull-Clark sheme which is based on bicubic B-splines.

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Ključne besede: subdivizijske krivulje in ploskve, subdivizijske sheme, kontrolna mreža, neregularne točke, B-zlepki

Keywords: subdivision curves and surfaces, subdivision scheme, kontrol mesh, extraordinary points, B-splines

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