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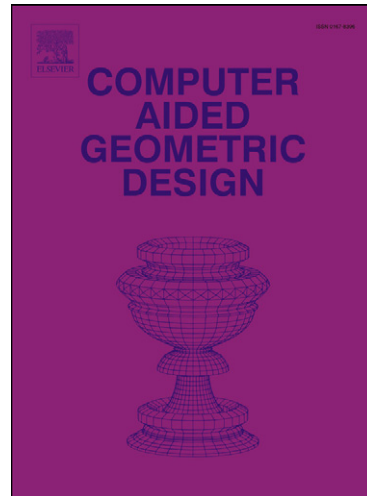
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C^1 interpolation by rational biarcs with rational rotation minimizing directed frames

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Abstract

An interpolation scheme to construct rational spatial biarcs of degree eight along with rational rotation-minimizing directed frames of degree six is presented. The method is significant for the applications in camera motion planning. Namely, the interpolating biarc and the associated frame can be used to define the trajectory and the orientation of a camera while imaging a prescribed stationary object. The input data needed by the proposed scheme are the initial and the final curve positions and tangent vectors, together with the associated end frame orientations. Biarcs are used in order to reduce the degree of the resulting curve and of the frame as much as possible. The smoothness required for both the curve and the frame is C^1 and, under some mild data restrictions, it can be increased to C^2 at the point where the two arcs join. Numerical examples confirm that the scheme behaves well in practice.

Keywords: Camera motion, Rotation-minimizing frame, Directed frame, Hermite interpolation, Biarcs

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