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3D sketching for aesthetic design using fully free-form deformation features

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Author(s): Cheutet V, Catalano CE, Pernot JP, Falcidieno B, Giannini F, Leon JC

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Abstract: This paper addresses the designers' activity and in particular the way designers express an object shape in 2D sketches through character lines and how these lines form a basis for sketching shapes in 3D. The tools currently available in commercial CAS/CAD systems to manipulate the digital models are still not sufficiently suited to support design. In this paper, the so-called fully free-form deformation features (delta-F-4) are introduced as a modelling method to take into account the curve-oriented stylists' way of working. Both the advantages of a free-form surface deformation method and a feature-based approach are merged to define these high-level modelling entities allowing for a direct manipulation of surfaces through a limited number of intuitive parameters. Such features incorporate several characteristics designed to handle the uncertainties and/or inconsistencies of the designer's input during a sketching activity. In addition, a delta-F-4 classification is proposed to enable a fast access to the desired shape according to its semantics and characteristics. (c) 2005 Published by Elsevier Ltd.

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