Surface-Depended growth kinematics

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Abstract

In this paper, we investigate the surface-dependent growth model in Euclidean 3-space. The surface-dependent model is developed to model the kinematics of surface growth for objects that can be generated by the curves on the surface, such as parasites and plants. This paper includes two main purposes for this model. The first one is to parametrize this model by using the quaternions and homothetic motions.Furthermore, we express the matrix representations of the surface-dependent growth model. The second one is to construct the surface-dependent growth model by using the growth velocity components related to the Darboux frame at each point of the generating curve. Moreover, to support the theory studied in the paper various illustrated examples are presented.

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