

The initial value problem for a tissue growth mathematical model

Zenggui Wang¹

¹Liaocheng Univ

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Abstract

This paper considers the initial value problem for a normal hyperbolic curvature flow derived by the cell-based mathematical models of tissue growth to account for the mechanistic influence of curvature on cell evolution. The equations satisfied by support functions under this flow is a hyperbolic Monge-Ampère equation. The equation for both perimeter and area of closed curves under the flow are also obtained. Based on this, we show that for a closed curve, if the initial velocity $v_{-0} < 0$, the solution of this flow converges to a point in finite time; if $v_{-0} > 0$, the solution of this flow exists for all $t \in [0, \infty)$.

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