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#### A SECOND-ORDER UNCONDITIONALLY STABLE METHOD FOR THE ANISOTROPIC DENDRITIC CRYSTAL GROWTH MODEL WITH AN ORIENTATION-FIELD

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摘要: In this article, we develop a linear, unconditionally energy stable computational scheme for solving the dendritic crystal growth model with the orientational field. We apply the phase field model to describe the evolution of crystal with rotation. The model, which couples the heat equation and anisotropic Allen-Cahn type equation, is a complicated nonlinear system. The time integration is based on the second-order Crank-Nicolson method. The anisotropic coefficient is treated by using the invariant energy quadratization. We mathematically prove that the proposed method is unconditionally energy stable. The second-order spatial and temporal accuracy will be preserved for the numerical approximation. Various computational tests are performed to show the accuracy, stability, and efficiency of the proposed scheme. (c) 2022 IMACS. Published by Elsevier B.V. All rights reserved.

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