Convective Allen–Cahn equation for the boundedness of the order parameter

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ABSTRACT

Mass conserved phase-field modeling has been studied over the past decades, and different types of conservative Allen–Cahn equations have been proposed and developed, so far. We consider a novel Allen–Cahn equation having the boundedness property, and prove the existence and uniqueness of a classical solution. Furthermore, we show that the solution is bounded by 1 with an initial datum bounded by 1. From the numerical point of view, we investigate a linear unconditionally energy stable splitting scheme of the our model for the boundedness of numerical solutions. Various numerical experiments are given to demonstrate the validity of the our method and to make distinctions from a few related methods.

REFERENCES