

Monotonicity formula of Allen-Cahn equations for surface evolution equations

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We consider the Allen-Cahn equations for the surface evolution equations such as the mean curvature flow and the volume preserving mean curvature flow. Similar to the mean curvature flow, the Allen-Cahn equation has the monotonicity formula under suitable conditions. The formula is used, for example, to prove that the solutions to the Allen-Cahn equation converge to the Hausdorff measures of the mean curvature flow. In this talk, we mainly prove the monotonicity formula of the Allen-Cahn equation for the volume preserving mean curvature flow and show the existence theorem for weak solutions as an application of the formula.