# Karlstad Applied Analysis Seminar (2020)

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# Recent results on the structure-preserving scheme for the Allen-Cahn equation with a dynamic boundary condition

## Abstract

In this talk, we propose a structure-preserving finite difference scheme for the Allen–Cahn equation with a dynamic boundary condition. In this model, the total energy dissipation, which means the sum of energy in bulk and on the boundary decreases, holds. Thus, we design a structure-preserving scheme for the target equation so that the scheme retains the dissipative property using the discrete variational derivative method proposed by Furihata and Matsuo (2010). This method is one of the structure-preserving numerical methods and enables us to derive the structure-preserving scheme systematically. We note that how to discretize the energy which characterizes the equation, it is important and essential in this method. This talk aims to introduce how the structure-preserving scheme is constructed and show recent mathematical results on the scheme. Also, we show the results of numerical simulations. If there is any time, we also talk about structure-preserving schemes for the Cahn–Hilliard equation with dynamic boundary conditions.