

Seminar of the Work Group
Nonlinear Partial Differential Equations
SS 22

Speaker: Dr. Björn de Rijk
June 28th, 2022, 14:00 - 15:00
Seminar room: 3.061

Nonlinear stability and asymptotic behavior of periodic wave trains in
reaction-diffusion systems against C_{ub}^2 -perturbations

KIT

Abstract

In this talk, I present a nonlinear stability theory for periodic wave trains in reaction-diffusion systems, which relies on pure L^∞ -estimates only. Our analysis shows that localization or periodicity requirements on perturbations, as present in the current literature, can be completely lifted. Instead, we only require that the initial perturbation and sufficiently many of its derivatives are bounded. Hampered by the lack of localization, we must fully rely on diffusive smoothing to render decay in the nonlinear argument. We apply the Cole-Hopf transform to eliminate the most critical nonlinear terms, which cannot be controlled by diffusive smoothing. Ultimately, we establish nonlinear modulational stability of diffusively spectrally stable wave trains against C_{ub}^2 -perturbations and approximate the spatio-temporal phase modulation by a solution of the viscous Hamilton-Jacobi equation.