

SINGULAR WAVE-TO-HEAT LIMIT WITH VARIABLE PROPAGATION SPEED

ABSTRACT. We investigate the long-time dynamics of a damped wave equation with spatially varying propagation speed and a nonlinear source. The model contains a small inertial parameter and converges formally to a reaction–diffusion equation as this parameter tends to zero. We establish the well-posedness of the associated dynamical systems and the existence of global attractors uniformly with respect to the perturbation parameter. We then derive quantitative estimates for the singular hyperbolic–parabolic limit and prove the upper semicontinuity of the attractors, accounting simultaneously for the vanishing inertia and the variation in propagation speed.

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