

Patterns and Waves for Discrete and Continuum
Bistable Equations with Indefinite Interaction

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Abstract: I will describe joint work with A. Chmaj and with X. Chen on the equation $u_t = d(J * u - u) + f(u)$, where $d > 0$, f is bistable, either $u \in l^\infty$ in the discrete case or $u \in L^\infty$ in the continuum, and $*$ is convolution, discrete or continuous. The kernel J may change sign but has unit integral. We give conditions under which stable stationary patterns exist and conditions under which traveling waves exist, even when $J(x)$ changes sign with x . Thus, the presence of both excitatory and inhibitory couplings can lead to both pattern formation or homogeneity depending on finer details in the connections.