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Samples of pattern formation under advection

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Advection terms break symmetry and cause pattern formation to come with transport. We present some results on the influence of constant advection terms in one component of the system on the onset of pattern formation. In reaction diffusion systems, stripes in the direction of advection are in a certain sense preferred over the otherwise dominant hexagons. In a specific system class the onset in parameter space monotically moves with advection. Numerically, increasing advection brings stability region of wavetrains in 2D closer to that in 1D. In a fluid model for plasma, we show that only moderate advection destabilizes, while the basic state in is globally stable for large and small advection. Numerically, decreasing diffusion increases the complexity of secondary bifurcations. This is drawn from joint work with several collaborators over the past few years.