

STATIONARY NON-RADIAL LOCALIZED PATTERNS IN THE PLANAR SWIFT-HOHENBERG PDE:  
COMPUTER-ASSISTED PROOFS OF EXISTENCE

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In this talk we present a general method to rigorously prove existence of strong solutions to a large class of semi-linear PDEs in Sobolev/Hilbert spaces via computer-assisted proofs. Considering a large enough hypercube, we use Fourier series to compute a numerical approximation of the solution, which is then refined via a finite-dimensional trace theorem to obtain a smooth function with support on the hypercube. Finally, a Newton-Kantorovich theorem is applied to demonstrate that a true solution exists nearby this refined solution. As an application, we prove the existence of stationary non-radial localized patterns in the planar Swift-Hohenberg PDE.