Examples of Taylor Methods for Computer Assisted Proofs

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We present two recent applications of the Taylor approach to computer assisted proofs. In the first example, we introduce a new technique to provide rigorous bounds for the invariant manifold of a dynamical system at some equilibrium point, and we use the results to prove the existence of a travelling wave solution for a model of biological tissue. In the second example we prove the existence of the critical fixed point (F,G) for MacKay's renormalization operator for pairs of maps of the plane. The maps F and G commute, are area-preserving, reversible, real analytic, and they satisfy a twist condition.