Invariant manifolds of partial functional differential equations

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Abstract: This paper is concerned with the existence, smoothness and attractivity of invariant manifolds for evolutionary processes on general Banach spaces when the nonlinear perturbation has a small global Lipschitz constant and locally C^k-smooth near the trivial solution. Such a nonlinear perturbation arises in many applications through the usual cut-off procedure, but the requirement in the existing literature that the nonlinear perturbation is globally C^k-smooth and has a globally small Lipschitz constant is hardly met in those systems for which the phase space does not allow a smooth cut-off function. Our general results are illustrated by and applied to partial functional differential equations for which the phase space C([-r, 0], X) (where r>0 and X being a Banach space) has no smooth inner product structure and for which the validity of variation-of-constants formula is still an interesting open problem. ?? 2003 Elsevier Inc. All rights reserved.

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