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Can a variational approach describe pulse splitting in a dispersion managed system?

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Abstract

When looking for solitons in nonlinear systems, it is often useful to have a simplifying tool. One such tool is the variational method. On the other hand, in the presence of fast oscillations, the wavefunction of the system can split into two distinct parts. This is not describable by the classical variational method. Edwards *et al.*, (J. Phys. B 38(4), 2005, pp. 363-76), introduced a hybrid variational analysis which can describe the dynamics in one selected direction more accurately. However, it remained to be seen how well this method describes the dynamics of solitons, in particular their splitting and subsequent recombining. Here we investigate an application of the hybrid variational analysis to a two dimensional system with dispersion management, where such splitting is known to occur. We conclude that indeed agreement is good. This could encourage wider use of the hybrid method.



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