Existence of solitary waves for a class of nonlocal nonlinear equations

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We are concerned with the existence of solitary wave solutions $u(x,t) = \phi_c(x-ct)$ of the general class of nonlocal nonlinear wave equations $u_{tt} - Lu_{xx} = B(g(u))_{xx}$ [1], with power-type nonlinearities. The main characteristic of this class of equations is the existence of two sources of dispersion, characterized by two pseudo-differential operators L and B. Members of the class arise as mathematical models for the propagation of dispersive waves in a wide variety of situations. For instance, the so-called double-dispersion equation and the Boussinesq-type equations are members of the class. We establish the existence of solitary wave solutions by solving a constrained variational problem with the concentration-compactness method of Lions. This is a joint work with Husnu A. Erbay and Albert Erkip. This work has been supported by the Scientific and Technological Research Council of Turkey (TUBITAK) under the project TBAG-110R002.

References

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