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Traveling kinks in cubic nonlinear Ginzburg-Landau equations

H. C. Rosu, O. Cornejo-Perez, P. Ojeda-May

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Nonlinear cubic Euler-Lagrange equations of motion in the traveling variable are usually derived from Ginzburg-Landau free energy functionals frequently encountered in several fields of physics. Many authors considered in the past damped versions of such equations with the damping term added by hand simulating the friction due to the environment. It is known that even in this damped case kink solutions can exist. By means of a factorization method, we provide analytic formulas for several possible kink solutions of such equations of motion in the undriven and constant field driven cases, including the recently introduced Riccati parameter kinks which were not considered previously in such a context. The latter parameter controls the delay of the switching stage of the kinks

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