

ASYMPTOTIC WAVE
SOLUTIONS FOR THE MODEL OF A MEDIUM
WITH VAN DER POL OSCILLATORS

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S u m m a r y

A one-dimensional mathematical model for a complex medium with van der Pol oscillators has been studied. Using the Bogolyubov–Mitropolsky method, the wave solutions for a weakly nonlinear model are derived, with their amplitudes being described by a three-dimensional dynamical system analyzed in more details by numerical and qualitative methods. In particular, periodic, multiperiodic, and chaotic trajectories are found in the phase space of the dynamical system. Bifurcations of those regimes were considered using the Poincaré section technique. Exact solutions are derived in the case where the three-dimensional system for amplitudes is reduced to the two-dimensional one.