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Nonlinear pulsations of a Hamiltonian system of the fourth order by a nonlinear trigonometric series GEORGE MIROSHNIKOV, The City College of the City University of New York — Dynamics of Hamiltonian systems is the key issue of solitary waves since the initial-value problems on free surfaces and interfaces are reduced to Hamiltonian problems in the reference frame moving with the wave. The Hamiltonian approach covers applications at high Reynolds numbers, which range from the famous irrotational Boussinesq-Rayleigh solitary wave to the rotational waves with a uniform vorticity. The Hamiltonian system with a polynomial potential of the fourth order is studied in the asymmetric case of subcritical periodic pulsations by using a nonlinear trigonometric series in even powers of cosine. The series solutions are computed symbolically and compared with the numerical solution using the Fehlberg fourth-fifth order Runge-Kutta method with degree four interpolant. It is shown that the series solutions with uniform convergence are superior to the numeric solutions with local convergence. The qualitative comparison of the theoretical solutions with the experimental profiles of the Geminga pulsar is also provided.

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