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Period-two solution for a class of distributed delay differential equations

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We study the existence of periodic solutions for differential equations with distributed delay. It is shown that, for a class of distributed delay differential equation, a symmetric period-2 solution can be obtained as a periodic solution of a Hamiltonian system of ordinary differential equations, where the period is twice the maximum delay. This study extends the result of Kaplan and Yorke (J. Math. Anal. Appl., 1974) for a discrete delay differential equation with an odd nonlinear function. We illustrate the result presenting distributed delay differential equations that have periodic solutions expressed in terms of Jacobi elliptic functions.