Cañada, A.; **Drábek, P.**

On semilinear problems with nonlinearities depending only on derivatives. (English)

Zbl 0852.34018
SIAM J. Math. Anal. 27, No. 2, 543-557 (1996).

The authors consider semilinear boundary value problems

$$u''(t) + \lambda_1 u(t) + g(t, u'(t)) = f(t), \quad t \in I, \tag{1}$$

$$(Bu)(t) = 0, \quad t \in \partial I, \tag{2}$$

where $I = [0, \pi]$, B denotes either the Dirichlet or the Neumann or the periodic boundary conditions, respectively, and λ_1 is the first eigenvalue of the corresponding linear problem $u''(t) + \lambda u(t) = 0$, $t \in I$, $(Bu)(t) = 0$, $t \in \partial I$. The nonlinear function g is supposed to be bounded and, in some cases, satisfies additional differentiability assumptions and asymptotic conditions. The authors emphasize the dependence of g on the derivative of the solution $u'(t)$ in order to show the qualitative difference of this case and the Landesman-Lazer-type problem in which the nonlinearity g depends only on the solution $u(t)$. The authors establish the solvability of the problem (1), (2).

Reviewer: A.I.Kolosov (Khar'kov)

MSC:

34B15	Nonlinear boundary value problems for ordinary differential equations	Cited in **1** Review
34C25	Periodic solutions to ordinary differential equations	Cited in **18** Documents

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