

**Almira, Jose María; Del Toro, Naira**

**Remarks on semilinear problems with nonlinearities depending on the derivative.** (English)

[Zbl 1033.34021](#)

Electron. J. Differ. Equ. 2003, Paper No. 18, 11 p. (2003).

Let  $g \in C([a, b] \times \mathbb{R}^n; \mathbb{R}^n)$ ,  $\bar{f} \in \mathbb{R}^n$ , and  $\tilde{f} \in C([a, b]; \mathbb{R}^n)$  with  $\int_a^b \tilde{f}(t) dt = 0$ . The authors consider the second-order differential equation

$$u''(t) + g(t, u'(t)) = \bar{f} + \tilde{f}(t), \quad t \in (a, b),$$

with either Neumann or periodic type boundary conditions at  $a, b$ , and investigate the range of each respective problem for a fixed  $\tilde{f}$ . Of special interest is the asymptotic behavior of the range when  $n = 1$ . The authors extend earlier results by *A. Canada* and *P. Drábek* [SIAM J. Math. Anal. 27, 543–557 (1996; [Zbl 0852.34018](#))] and *J. Mawhin* [Acta Math. Inform. Univ. Ostrav. 2, 61–69 (1994; [Zbl 0853.34021](#))].

Reviewer: [Sergiu Aizicovici \(Athens/Ohio\)](#)

**MSC:**

[34B15](#) Nonlinear boundary value problems for ordinary differential equations

[34L30](#) Nonlinear ordinary differential operators

**Keywords:**

nonlinear boundary value problem; Neumann and periodic problems

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