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Singular boundary value problems for superlinear second order ordinary and delay differential equations. (English) [Zbl 0863.34022](#)

J. Differ. Equations 130, No. 2, 333-355 (1996).

The authors study the existence of solutions for the following singular boundary value problems for nonlinear second order ordinary and delay differential equations:

$$\begin{cases} y''(t) + q(t)f(t, y(t)) = 0, & 0 < t < 1, \\ y(0) = y(1) = 0; \end{cases} \quad (1)$$

$$\begin{cases} \frac{1}{p(t)}(p(t)y'(t))' + q(t)f(t, y(t)) = 0, & 0 < t < 1, \\ \lim_{t \searrow 0} p(t)y'(t) = y(1) = 0; \end{cases} \quad (2)$$

$$\begin{cases} y''(t) + q(t)f(t, y(t-r)) = 0, & t \in (0; 1) \setminus \{r\}, \\ y(t) = \mu(t), & t \in [-r; 0], \\ y(1) = 0, & 0 < r < 1, r = \text{const.} \end{cases} \quad (3)$$

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MSC:

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

[34K10](#) Boundary value problems for functional-differential equations

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Keywords:

singular boundary value problem; second order differential equations; delay differential equations

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