

## MULTIPLICITY IN PARAMETER-DEPENDENT PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS

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We bring together various results of the author and collaborators concerning multiple solutions of two-point boundary value problems for ordinary differential equations.

First, equations of the type

$$x'' + \lambda f(x) = 0 \tag{1}$$

are considered together with the boundary conditions

$$x(0) = 0, \quad x(1) = 0. \tag{2}$$

Phase plane analysis and results on behavior of the time-map function for (1) are combined in order to explain the existence of multiple solutions. Emphasis is made on positive solutions of the problem (1), (2). Comparison with the existing results is made.

Second, two-parameter equations of the form

$$x'' + \lambda f(x^+) - \mu g(x^-) = 0 \tag{3}$$

are considered, where  $x^+ = \max\{x, 0\}$ ,  $x^- = \max\{-x, 0\}$ , together with the boundary conditions (2). These problems are studied in two directions. First, solution curves  $(\lambda, \mu, x)$  are considered for sign-changing solutions  $x(t)$ . Then a links with Fučik type problems are concerned and relations to Fučik type spectra is established.