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MULTIPLICITY OF POSITIVE SOLUTIONS FOR AN EVEN-ORDER NONHOMOGENEOUS BOUNDARY VALUE PROBLEM

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In this talk, we focus on the existence of multiple positive solutions for the $2n$th order ordinary differential equation,

$$u^{(2n)} = \lambda h\left(t, u, u'', \ldots, u^{(2(n-1))}\right),\ t \in (0,1),$$

satisfying the boundary conditions

$$u^{(2k)}(0) = 0,\ k = 0, \ldots, n-1$$
$$u^{(2k+1)}(1) = (-1)^k a_k,\ k = 0, \ldots, n-1$$

where $\lambda, a_0, \ldots, a_{n-1} \geq 0$, with $\sum_{k=0}^{n-1} a_k > 0$, and $h : [0,1] \times \prod_{i=0}^{n-1}(-1)^i[0,\infty) \to (-1)^n[0,\infty)$ is continuous. We transform the even order boundary value problem into a system of second order differential equations satisfying homogeneous right focal boundary conditions. Then, by applying the Guo-Krasnosel'skii Fixed Point Theorem several times, we show the existence of multiple positive solutions.

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