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Title: A second order periodic boundary value problem with a parameter and vanishing Green's functions

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We consider the following second order periodic boundary value problem with a parameter $\lambda \in (0, \infty)$, $i = 1, 2, \dots, n$,

$$\begin{cases} x_i'' + a_i(t)x_i = \lambda g^i(t)f^i(x), & 0 \leq t \leq T, \\ x_i(0) = x_i(T), \quad x_i'(0) = x_i'(T). \end{cases}$$

By using fixed point theorems in a cone, some existence and nonexistence results for nonnegative solutions are established under different combinations of superlinearity and sublinearity of functions f^i at zero and infinity for an appropriately chosen parameter λ in the case where the associated nonnegative Green's functions may have zeros. The results are illustrated by an example.

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