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## Monotone Methods Applied to Some Higher Order Boundary Value Problems

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**Abstract:**

We prove the existence of a solution for the nonlinear boundary value problem

$$u^{(2m+4)} = f(x, u, u'', \dots, u^{(2m+2)}), \quad x \in [0, 1],$$

$$u^{(2i)}(0) = 0 = u^{(2i)}(1), \quad 0 \leq i \leq m + 1,$$

where  $f : [0, 1] \times \mathbb{R}^{m+2} \rightarrow \mathbb{R}$  is continuous. The technique used here is a monotone method in the presence of upper and lower solutions. We introduce a new maximum principle which generalizes one due to Bai which in turn was an improvement of a maximum principle by Ma.



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