Boundary data smoothness for solutions of nonlocal boundary value problems for \( n \)th order differential equations.

Under certain conditions, solutions of the \( n \)th order boundary value problem, \( y^{(n)} = f(x, y, y', \ldots, y^{(n-1)}), y(a) - \sum_{k=1}^{p} a_k y(\xi_k) = y_1, y^{(i-1)}(\gamma) = y_i, \) for \( 2 \leq i \leq n-1, \) and \( y(b) - \sum_{l=1}^{q} b_l y(\eta_l) = y_n, \) are differentiated with respect to boundary conditions, where \( c < a < \xi_1 < \cdots < \xi_p < \gamma < \eta_1 < \cdots < \eta_q < b < d, a_1, \ldots, a_p, b_1, \ldots, b_q \in \mathbb{R}, \) and \( y_1, \ldots, y_n \in \mathbb{R}. \) The method involves application of a Peano Theorem for initial value problems. (Received August 15, 2017)