Abstracts of MMA2009, May 27 - 30, 2009, Daugavpils, Latvia


# ON THE SOLVABILITY OF SOME NONLINEAR BOUNDARY VALUE PROBLEM

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Consider the second order two-point boundary value problem (BVP) of the form

$$x'' + p(t)\,x' = f(t,\,x), \tag{1}$$

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

where $t \in I := [0,\,1]$, $p \in C(I,\,\mathbb{R})$, $f \in C(I \times \mathbb{R}, \mathbb{R})$. We investigate the solvability of the BVP (1), (2) using a quasilinearization process described in [1], [2], [3]. Namely, we reduce the given nonlinear equation (1) to a quasi-linear one

$$x'' + p(t)\,x' + r(t)\,x = F(t,\,x), \tag{3}$$

where $F$ is continuous, bounded and Lipschitzian with respect to $x$ and the extracted linear part $\big(L_2x\big)(t) := x'' + p(t)\,x' + r(t)\,x$ is a non-resonant with respect to the boundary conditions (2).

We use a fact that modified quasi-linear problem (3), (2) has a solution, the oscillatory type of which corresponds to the type of non-resonance to the extracted linear part $\big(L_2x\big)(t)$.

Suppose that such quasilinearization is possible in some domain $\Omega$. If a solution $\xi(t)$ of the problem (3), (2) is located in this domain of equivalence $\Omega$ than $\xi(t)$ solves the original BVP (1), (2) also.

**REFERENCES**

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