NONLINEAR PERTURBED INTEGRAL EQUATIONS
RELATED TO NONLOCAL BOUNDARY VALUE PROBLEMS

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Abstract. By topological arguments, we prove new results on the existence, non-existence, localization and multiplicity of nontrivial solutions of a class of perturbed nonlinear integral equations. These type of integral equations arise, for example, when dealing with boundary value problems where nonlocal terms occur in the differential equation and/or in the boundary conditions. Some examples are given to illustrate the theoretical results.

Key Words and Phrases: Perturbed integral equation, nonlocal differential equation, nonlinear boundary condition, nontrivial solution, fixed point index, cone.

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References

[34] T. Jankowski, Multiple solutions for a class of boundary-value problems with deviating arguments and integral boundary conditions, Dynam. Systems Appl., 19(2010), 179–188.


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