

**On Linear Inhomogeneous Boundary-Value Problems  
for Differential Systems in Sobolev Spaces**

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For the systems of ordinary differential equations of an arbitrary order on a compact interval, we study a character of solvability of the most general linear boundary-value problems in the Sobolev spaces  $W_p^n$ , with  $n \in \mathbb{N}$  and  $1 \leq p \leq \infty$ . We find the indices of these Fredholm problems and obtain a criterion of their well-posedness. Each of these boundary-value problems relates to a certain rectangular numerical characteristic matrix with kernel and cokernel of the same dimension as the kernel and cokernel of the boundary-value problem. The condition for the sequence of characteristic matrices to converge is found. We obtain a constructive criterion under which the solutions to these problems depend continuously on the small parameter  $\varepsilon$  at  $\varepsilon = 0$ , and find the degree of convergence of the solutions. Also applications of these results to multipoint boundary-value problems are obtained.

1. O. M. Atlasiuk, V. A. Mikhailets, *Fredholm one-dimensional boundary-value problems in Sobolev spaces*. Ukr. Math. J. **70** (2019), no. 10, 1526–1537.
2. O. M. Atlasiuk, V. A. Mikhailets, *Fredholm one-dimensional boundary-value problems with parameter in Sobolev spaces*. Ukr. Math. J. **70** (2019), no. 11, 1677–1687.
3. O. M. Atlasiuk, *Limit theorems for solutions of multipoint boundary-value problems in Sobolev spaces*. Journal of Mathematical Sciences **247** (2020), no. 2, 238–247.