

# Linear ordinary differential systems with generic boundary conditions in Sobolev spaces

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We study linear systems of ordinary differential equations on a finite interval with the most general (generic) inhomogeneous boundary conditions in Sobolev spaces. These boundary problems include all known types of classical and numerous nonclassical conditions. The latter may contain derivatives of integer and fractional order, which may exceed the order of the differential equation.

We investigate the characteristic of solvability of inhomogeneous boundary-value problems, prove their Fredholm properties, and find the indices, the dimensions of the kernel, and the cokernel of these problems. Moreover, we obtained the necessary and sufficient conditions for continuity in the parameter of solutions to the introduced boundary-value problems in the Sobolev spaces. Some applications of these results to the solutions of multipoint boundary-value problems are also presented.

The talk is based on joint work with Professor Volodymyr Mikhailets.