Transfer of boundary conditions for DAEs of index 1

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Abstract

In this paper, the concept of Abramov's method for transferring boundary conditions posed for regular ordinary differential equations is applied to index 1 DAEs. Having discussed the reduction of inhomogeneous problems to homogeneous ones and analyzed the underlying ideas of Abramov's method, we consider boundary value problems for index 1 linear DAEs both with constant and varying leading matrix. We describe the relations defining the subspaces of solutions satisfying the prescribed boundary conditions at one end of the interval. The index 1 DAEs that realize the transfer are given and their properties are studied. The results are reformulated for inhomogeneous index 1 DAEs, as well.

Key words: Differential-algebraic equations, boundary value problems, transfer method

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