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ON STABILITY ANALYSIS FOR KURAMOTO-TSUZUKI EQUATION WITH NONLOCAL BOUNDARY CONDITIONS

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Kuramoto-Tsuzuki equation describes the chemical processes with chemical reaction and diffusion. The similar Ginzburg-Landau equation is considered in the analysis of nonlinear optics and fluid dynamics. These equations in various applications are used with different initial and boundary conditions.

We investigate the linear part of Kuramoto-Tsuzuki equation. The parabolic and Schrödinger equations are only the partial cases of the Kuramoto-Tsuzuki equation. In the analysis the nonlocal boundary conditions are used. The conditions of this type arise in various real applications. It is clear that boundary conditions have an important role in the stability analysis.

We consider a linear part of the Kuramoto-Tsuzuki equation with the nonlocal boundary conditions. A general methodology for the stability analysis proposed in [1, 2] is applied. First the stability region for Kuramoto-Tsuzuki equation is constructed. Next the stability regions for Euler schemes are obtained. At least the structure of spectrum for the second order differential operator with nonlocal boundary conditions regarding to the results presented in [3] is analyzed.

The obtained results on stability for Kuramoto-Tsuzuki equation are applied in the numerical experiments and they have confirmed theoretical results.

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