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New stability analysis for neutral type neural networks with discrete and distributed delays using a multiple integral approach.

Summary: This study is concerned with the problem of stability analysis for neutral type neural networks with discrete and distributed delays. By making full use of a novel integral inequality proved to be less conservative than the celebrated Jensen’s inequality, new stability results are established. Besides, a multiple integral inequality is also proposed firstly in neutral type neural networks with mixed delays. Based on the integral inequality, improved stability criteria in terms of Linear Matrix Inequalities (LMIs) are derived by constructing an appropriate Lyapunov-Krasovskii functional including the multiple integral terms showed to have a great potential efficient in practice. Furthermore, less conservative stability results are obtained by dividing the distributed delay into multiple nonuniformly subinterval. Finally, numerical examples are presented to illustrate the effectiveness and advantages of the theoretical results.

Keywords: stability analysis; neutral type neural networks; discrete and distributed delays; Jensen’s inequality; Lyapunov-Krasovskii functional
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