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Summary: The Chebyshev spectral method is adopted for a numerical analysis of a type of integral equation with cubic delay and its convergence is also analyzed. After two linear transformations of the equation, it is subjected to discretization with the Gauss quadrature formula to get the approximate solution. Then with the Chebyshev spectral collocation method and some lemmas, it is found that the numerical error decays exponentially in the $L^\infty$ space and the $L^2_{\omega_c}$ space. Finally, a numerical example is given to show the feasibility and effectiveness of the Chebyshev spectral collocation method.

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integral equation; Chebyshev spectral collocation method; cubic delay; Gauss quadrature formula; numerical analysis

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