## **Accepted Manuscript**

Numerical study of self-adjoint singularly perturbed two-point boundary value problems using collocation method with error estimation

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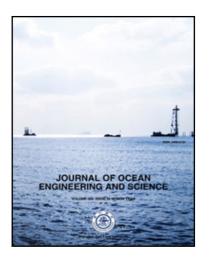
PII: S2468-0133(18)30065-2

DOI: https://doi.org/10.1016/j.joes.2018.07.001

Reference: JOES 81

To appear in: Journal of Ocean Engineering and Science

Received date: 1 May 2018 Revised date: 26 July 2018 Accepted date: 27 July 2018



Please cite this article as: Khalid K. Ali, A.R. Hadhoud, M.A. Shaalan, Numerical study of self-adjoint singularly perturbed two-point boundary value problems using collocation method with error estimation, *Journal of Ocean Engineering and Science* (2018), doi: https://doi.org/10.1016/j.joes.2018.07.001

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#### ACCEPTED MANUSCRIPT

### Highlights

- In this paper, a numerical treatment of self-adjoint singularly perturbed second order two point boundary value problems using trigonometric quintic B-splines.
- Trigonometric quintic B-spline collocation method has a truncation error of  $O\left(h^6\right)$  and converges to the exact solution with  $O\left(h^4\right)$ .
- From the computational results, the proposed method demonstrates efficient solutions of the considered problems at different values of n and perturbation parameter  $\epsilon$ .
- Four numerical examples are presented, which compare with the analytic solutions by finding the maximum absolute errors.
- The numerical examples show that our method is very effective and the maximum absolute error is acceptable.

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