A numerical method for finding solution of the distributed order time-fractional forced Korteweg-de Vries equation including the Caputo fractional derivative

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Abstract

In this paper, for the first time, the distributed order time-fractional forced Korteweg-de Vries equation is studied. We use a numerical method based on the shifted Legendre operational matrix of distributed order fractional derivative with Tau method to find approximate solution of distributed order forced Korteweg-de Vries equation. This shifted Legendre operational matrix of distributed order fractional derivative with Tau method are used to reduce the solution of the distributed order time-fractional forced Korteweg-de Vries equations to a system of algebraic equations. An error analysis and convergence are obtained. Finally, to display the applicability and validity of the numerical method some examples are implemented.
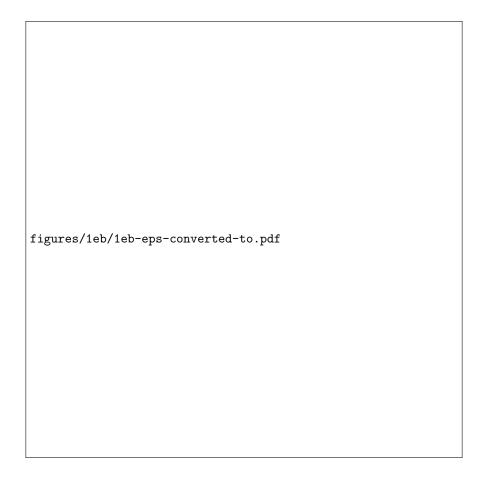
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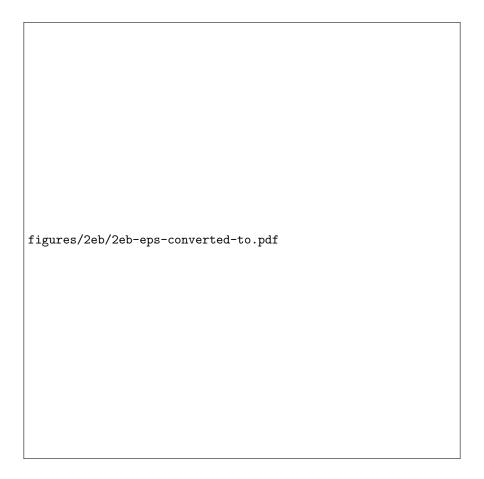figures/1a/1a-eps-converted-to.pdf

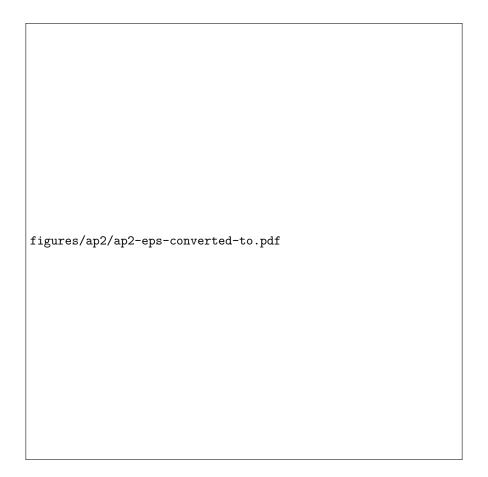figures/1b/1b-eps-converted-to.pdf

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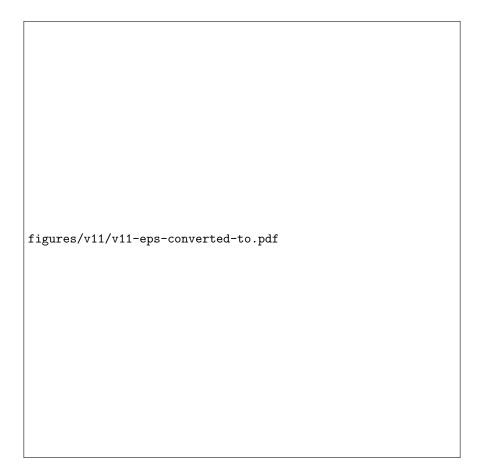figures/1eb/1eb-eps-converted-to.pdf

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8

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