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An analysis of time-fractional heat transfer problem using two-scale approach. (English)

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Summary: Porous media have been a significant subject of research for a long time due to their applicability in various sciences. This paper investigates the heat transfer phenomenon in the porous media. A convergent solution is obtained for a two-dimensional time-fractional equation arising in a porous soil heat transfer. He's polynomial and He's variational iteration method are used to accomplish the required goals. The fractional derivative used in the article is described by He's definition. He's fractional complex transform is used to convert the fractional differential equation into its traditional partner differential equation, which can be solved iteratively. Graphical representations of the results are provided to demonstrate the efficacy of the methods used.

MSC:

35R11 Fractional partial differential equations

35A25 Other special methods applied to PDEs

35K15 Initial value problems for second-order parabolic equations

Keywords:

heat transfer equation; variational iteration method (VIM); He's polynomial; He's fractional complex transform (FCT)

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