

*Journal of Mathematics and Computer Science*

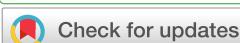
All Fields

Paper Title

Author

Search

Numerical solutions of fuzzy integro-differential equations of the second kind

Volume 23, Issue 1, pp 67--74<http://dx.doi.org/10.22436/jmcs.023.01.07> (<http://dx.doi.org/10.22436/jmcs.023.01.07>)**Publication Date:** October 02, 2020**Submission Date:** June 05, 2020**Revision Date:** July 09, 2020**Acceptance Date:** August 25, 2020[Download PDF](https://www.isr-publications.com/jmcs/9179/download-numerical-solutions-of-fuzzy-integro-differential-equations-of-the-second-kind.pdf) (<https://www.isr-publications.com/jmcs/9179/download-numerical-solutions-of-fuzzy-integro-differential-equations-of-the-second-kind.pdf>)[Download XML](https://www.isr-publications.com/jmcs/articles-9179-numerical-solutions-of-fuzzy-integro-differential-equations-of-the-second-kind.xml) (<https://www.isr-publications.com/jmcs/articles-9179-numerical-solutions-of-fuzzy-integro-differential-equations-of-the-second-kind.xml>)**Export citations**

1238

Downloads

2408

Views



Authors

Mohammed S. Bani Issa

- Department of Mathematics, P. E. T. Research Foundation, University of Mysore, Mandya 570401, India.

Ahmed A. Hamoud (mailto:drahmedselwi985@gmail.com)

- Department of Mathematics, Taiz University, Taiz, Yemen.

Kirtiwant P. Ghadle

- Department of Mathematics, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, India.

Abstract

In this paper, the Adomian decomposition method, modified Adomian decomposition method, variational iteration method, and homotopy perturbation method are used to solve the fuzzy integro-differential equations. We described the methods and compared the results with their exact solutions to demonstrate the methods' validity and applicability. Examples are provided to illustrate the results.

Share and Cite

-  (https://www.facebook.com/dialog/share?app_id=2488960518031259&display=popup&href=https://www.isr-publications.com/jmcs/articles-9179-numerical-solutions-of-fuzzy-integro-differential-equations-of-the-second-kind&hashtag=#fuzzyIntegroDifferentialEquations)
-  (<https://twitter.com/intent/tweet?text=Numerical%20solutions%20of%20fuzzy%20integro-differential%20equations%20of%20the%20second%20kind&url=https://www.isr-publications.com/jmcs/articles-9179-numerical-solutions-of-fuzzy-integro-differential-equations-of-the-second-kind&via=RezaSaadati3&hashtags=fuzzyIntegroDifferentialEquations,adomianDecompositionMethod,modifiedAdomianDecompositionMethod>)
-  ([https://www.linkedin.com/shareArticle?url=https://www.isr-publications.com/jmcs/articles-9179-numerical-solutions-of-fuzzy-integro-differential-equations-of-the-second-kind&mini=true&title=Numerical%20solutions%20of%20fuzzy%20integro-differential%20equations%20of%20the%20second%20kind&summary=In%20this%20paper%20the%20Adomian%20decomposition%20method%20modified%20Adomian%20decomposition%20method%20variational%20iteration%20method%20and%20homotopy%20perturbation%20method%20are%20used%20to%20solve%20the%20fuzzy%20integro-differential%20equations.%20We%20described%20the%20methods%20and%20compared%20the%20results%20with%20their%20exact%20solutions%20to%20demonstrate%20the%20methods%20validity%20and%20applicability.%20Examples%20are%20provided%20to%20illustrate%20the%20results%20&source=Journal%20of%20Mathematics%20and%20Computer%20Science%20\(JMCS\)](https://www.linkedin.com/shareArticle?url=https://www.isr-publications.com/jmcs/articles-9179-numerical-solutions-of-fuzzy-integro-differential-equations-of-the-second-kind&mini=true&title=Numerical%20solutions%20of%20fuzzy%20integro-differential%20equations%20of%20the%20second%20kind&summary=In%20this%20paper%20the%20Adomian%20decomposition%20method%20modified%20Adomian%20decomposition%20method%20variational%20iteration%20method%20and%20homotopy%20perturbation%20method%20are%20used%20to%20solve%20the%20fuzzy%20integro-differential%20equations.%20We%20described%20the%20methods%20and%20compared%20the%20results%20with%20their%20exact%20solutions%20to%20demonstrate%20the%20methods%20validity%20and%20applicability.%20Examples%20are%20provided%20to%20illustrate%20the%20results%20&source=Journal%20of%20Mathematics%20and%20Computer%20Science%20(JMCS)))

ISRP Style

Mohammed S. Bani Issa, Ahmed A. Hamoud, Kirtiwant P. Ghadle, Numerical solutions of fuzzy integro-differential equations of the second kind, Journal of Mathematics and Computer Science, 23 (2021), no. 1, 67--74

AMA Style

Issa Mohammed S. Bani, Hamoud Ahmed A., Ghadle Kirtiwant P., Numerical solutions of fuzzy integro-differential equations of the second kind. J Math Comput SCI-JM. (2021); 23(1):67--74

Chicago/Turabian Style

Issa, Mohammed S. Bani, Hamoud, Ahmed A., Ghadle, Kirtiwant P.. "Numerical solutions of fuzzy integro-differential equations of the second kind." Journal of Mathematics and Computer Science, 23, no. 1 (2021): 67--74

Keywords

-  *Fuzzy integro-differential equations*
-  *Adomian decomposition method*
-  *modified Adomian decomposition method*
-  *variational iteration method*
-  *homotopy perturbation method*

MSC

34A07

49M27

65K10

65H20

References

[1] T. Allahviranloo, S. Abbasbandy, O. Sedaghatfar, P. Darabi, A new method for solving fuzzy integro-differential equation under generalized differentiability, *Neural. Comput. Appl.*, 21 (2012), 191--196

 [View Article](https://link.springer.com/article/10.1007/s00521-011-0759-3) (<https://link.springer.com/article/10.1007/s00521-011-0759-3>)

 [Google Scholar](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=A+new+method+for+solving+fuzzy+integro-differential+equation+under+generalized+differentiability&btnG=) (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=A+new+method+for+solving+fuzzy+integro-differential+equation+under+generalized+differentiability&btnG=)

[2] T. Allahviranloo, M. Khezerloo, O. Sedaghatfar, S. Salahshour, Toward the existence and uniqueness of solutions of second-order fuzzy Volterra integro-differential equations with fuzzy kernel, *Neural. Comput. Appl.*, 22 (2013), 133--141

 [View Article](https://link.springer.com/article/10.1007/s00521-012-0849-x) (<https://link.springer.com/article/10.1007/s00521-012-0849-x>)

 [Google Scholar](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Toward+the+existence+and+uniqueness+of+solutions+of+second-order+fuzzy+Volterra+integro-differential+equations+with+fuzzy+kernel&btnG=) (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Toward+the+existence+and+uniqueness+of+solutions+of+second-order+fuzzy+Volterra+integro-differential+equations+with+fuzzy+kernel&btnG=)

[3] M. S. Bani Issa, A. A. Hamoud, Some approximate methods for solving system of nonlinear integral equations, *Technol. Rep. Kansai Univ.*, 62 (2020), 388--398

 [View Article](http://www.academia.edu/download/63218130/5eaaf79443c3f20200506-105597-1x2ws00.pdf) (<http://www.academia.edu/download/63218130/5eaaf79443c3f20200506-105597-1x2ws00.pdf>)

 [Google Scholar](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Some+approximate+methods+for+solving+system+of+nonlinear+integral+equations&btnG=) (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Some+approximate+methods+for+solving+system+of+nonlinear+integral+equations&btnG=)

[4] M. S. Bani Issa, A. A. Hamoud, Solving systems of Volterra integro-differential equations by using semi-analytical techniques, *Technol. Rep. Kansai Univ.*, 62 (2020), 685--690

 [View Article](https://www.researchgate.net/profile/Ahmed_Hamoud3/publication/341359580_Solving_systems_of_Volterra_integro-differential_equations_by_using_semi-analytical_techniques/links/5ebc764a458515626ca7e983/Solving-systems-of-Volterra-integro-differential-equations-by-using-semi-analytical-techniques.pdf) (https://www.researchgate.net/profile/Ahmed_Hamoud3/publication/341359580_Solving_systems_of_Volterra_integro-differential_equations_by_using_semi-analytical_techniques/links/5ebc764a458515626ca7e983/Solving-systems-of-Volterra-integro-differential-equations-by-using-semi-analytical-techniques.pdf)

 [Google Scholar](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Solving+systems+of+Volterra+integro-differential+equations+by+using+semi-analytical+techniques&btnG=) (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Solving+systems+of+Volterra+integro-differential+equations+by+using+semi-analytical+techniques&btnG=)

[5] P. R. Bhadane, K. P. Ghadle, A. A. Hamoud, Approximate solution of fractional Black-Schole's European option pricing equation by using EHPM, *Nonlinear Funct. Anal. Appl.*, 25 (2020), 331--344

 [View Article](https://www.researchgate.net/profile/Kirtiwant_Ghadle/publication/341726988_APPROXIMATE SOLUTION_OF_FRACTIONAL_BLACK-SCHOLE'S_EUROPEAN_OPTION_PRICING_EQUATION_BY_USING_EHPM/links/5ed1dc1e92851c9c5e665e1a/APPROXIMATE-SOLUTION-OF-FRACTIONAL-BLACK-SCHOLES-EUROPEAN-OPTION-PRICING-EQUATION-BY-USING-EHPM.pdf) (https://www.researchgate.net/profile/Kirtiwant_Ghadle/publication/341726988_APPROXIMATE SOLUTION_OF_FRACTIONAL_BLACK-SCHOLE'S_EUROPEAN_OPTION_PRICING_EQUATION_BY_USING_EHPM/links/5ed1dc1e92851c9c5e665e1a/APPROXIMATE-SOLUTION-OF-FRACTIONAL-BLACK-SCHOLES-EUROPEAN-OPTION-PRICING-EQUATION-BY-USING-EHPM.pdf)

 [Google Scholar](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Approximate+solution+of+fractional+Black-Schole%27s+European+option+pricing+equation+by+using+EHPM&btnG=) (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Approximate+solution+of+fractional+Black-Schole%27s+European+option+pricing+equation+by+using+EHPM&btnG=)

- [6] L. A. Dawood, A. A. Sharif, A. A. Hamoud, Solving higher-order integro differential equations by VIM and MHPM, *Int. J. Appl. Math.*, 33 (2020), 253--264
☞ **View Article** (<http://dx.doi.org/10.12732/ijam.v33i2.5>)
☞ **Google Scholar** (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Solving+higher-order+integro+differential+equations+by+VIM+and+MHPM&btnG=)
- [7] S. Hajighasemi, T. Allahviranloo, M. Khezerloo, M. Khorasany, S. Salahshour, Existence and uniqueness of solutions of fuzzy Volterra integro-differential equations, 13th International Conference (Dortmund, Germany), 2010 (2010), 491--500
☞ **View Article** (https://link.springer.com/chapter/10.1007/978-3-642-14058-7_51)
☞ **Google Scholar** (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Existence+and+uniqueness+of+solutions+of+fuzzy+Volterra+integro-differential+equations&btnG=)
- [8] A. A. Hamoud, K. P. Ghadle, Existence and uniqueness of solutions for fractional mixed Volterra-Fredholm integro-differential equations, *Indian J. Math.*, 60 (2018), 375--395
☞ **View Article** (http://www.academia.edu/download/61909859/Mr._Ahmed_AL-Selwi20200127-10271-cl7smt.pdf)
☞ **Google Scholar** (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Existence+and+uniqueness+of+solutions+for+fractional+mixed+Volterra-Fredholm+integro-differential+equations&btnG=)
- [9] A. A. Hamoud, K. P. Ghadle, The approximate solutions of fractional Volterra-Fredholm integro-differential equations by using analytical techniques, *Probl. Anal. Issues Anal.*, 7 (2018), 41--58
☞ **View Article** (<http://issuesofanalysis.petsru.ru/article/genpdf.php?id=4350>)
☞ **Google Scholar** (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=The+approximate+solutions+of+fractional+Volterra-Fredholm+integro-differential+equations+by+using+analytical+techniques&btnG=)
- [10] A. A. Hamoud, K. P. Ghadle, Existence and uniqueness of the solution for Volterra-Fredholm integro-differential equations, *J. Sib. Fed. Univ. Math. Phys.*, 11 (2018), 692--701
☞ **View Article** (<http://journal.sfu-kras.ru/en/article/108417>)
☞ **Google Scholar** (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Existence+and+uniqueness+of+the+solution+for+Volterra-Fredholm+integro-differential+equations&btnG=)
- [11] A. A. Hamoud, K. P. Ghadle, Homotopy analysis method for the first order fuzzy Volterra-Fredholm integro-differential equations, *Indones. J. Electr. Eng. Comput. Sci.*, 11 (2018), 857--867
☞ **View Article** (http://www.academia.edu/download/58311828/ID_12985.pdf)
☞ **Google Scholar** (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Homotopy+analysis+method+for+the+first+order+fuzzy+Volterra-Fredholm+integro-differential+equations&btnG=)
- [12] A. A. Hamoud, K. P. Ghadle, Usage of the homotopy analysis method for solving fractional Volterra-Fredholm integro-differential equation of the second kind, *Tamkang J. Math.*, 49 (2018), 301--315
☞ **View Article** (<https://doi.org/10.5556/j.tkjm.49.2018.2718>)
☞ **MathSciNet** (<http://www.ams.org/mathscinet-getitem?mr=3879843>)
- [13] A. A. Hamoud, K. P. Ghadle, Some new existence, uniqueness and convergence results for fractional Volterra-Fredholm

integro-differential equations, J. Appl. Comput. Mech., 5 (2019), 58–69

 **View Article** (<https://dx.doi.org/10.22055/jacm.2018.25397.1259>)

 **Google Scholar** (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Some+new+existence%2C+uniqueness+and+convergence+results+for+fractional+Volterra-Fredholm+integro-differential+equations&btnG=)

[14] K. H. Hussain, A. H. Hamoud, N. M. Mohammed, Some new uniqueness results for fractional integro-differential equations, Nonlinear Funct. Anal. Appl., 24 (2019), 827–836

 **View Article** (<http://www.academia.edu/download/61493958/1238-3667-1-PB20191212-70309-ebw24u.pdf>)

 **Google Scholar** (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Some+new+uniqueness+results+for+fractional+integro-differential+equations&btnG=)

[15] N. Mikaeilvand, S. Khakrangin, T. Allahviranloo, Solving fuzzy Volterra integro-differential equation by fuzzy differential transform method, Proceedings of the 7th Conference of the European Society for Fuzzy Logic and Technology (Aix-Les-Bains, France), 2011 (2011), 891–896

 **View Article** (<https://dx.doi.org/10.2991/eusflat.2011.56>)

 **Google Scholar** (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Solving+fuzzy+Volterra+integro-differential+equation+by+fuzzy+differential+transform+method&btnG=)

[16] J. Y. Park, J. U. Jeong, On existence and uniqueness of solutions of fuzzy integro differential equations, Indian J. Pure Appl. Math., 34 (2003), 1503–1512

 **View Article** (https://insa.nic.in/writereaddata/UpLoadedFiles/IJPAM/20008a27_1503.pdf)

 **Google Scholar** (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=On+existence+and+uniqueness+of+solutions+of+fuzzy+integro+differential+equations&btnG=)

[17] M. Zeinali, S. Shahmorad, K. Mirnia, Fuzzy integro-differential equations: Discrete solution and error estimation, Iran. J. Fuzzy Syst., 10 (2013), 107–122

 **View Article** (http://ijfs.usb.ac.ir/article_169_4d7ef7b69c85251841a56ba41099c819.pdf)

 **MathSciNet** (<http://www.ams.org/mathscinet-getitem?mr=3113488>)

JMCS

Copyright © 2010 - 2024 JMCS. All rights reserved.