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Applications of the invariant subspace method on searching explicit solutions to certain non-linear evolution equations

Communication Info

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Abstract

This paper explores the application of the invariant subspace method as an effective analytical technique for obtaining explicit solutions to certain classes of nonlinear evolution equations. By identifying appropriate invariant subspaces, the method reduces complex partial differential equations to simpler ordinary differential equations, allowing for the construction of exact solutions. Several illustrative examples are presented, demonstrating the versatility and efficiency of the approach in handling nonlinear dynamics. The results highlight the potential of the invariant subspace method as a systematic tool for solving nonlinear evolution equations arising in mathematical physics and applied sciences.

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References

- [1] Kilbas AA, Trujillo JJ, Srivastava HM. *Theory and applications of fractional differential equations*. Amsterdam: Elsevier (2006).
- [2] Sahadevan R, Prakash P. Exact solutions and maximal dimension of invariant subspaces of time fractional coupled nonlinear partial differential equations. *Commun Nonlinear Sci Numer Simulat*. 10.1016/j.cnsns.2016.05.017, 2017, 158–77.
- [3] Feng W, Zhao SL, Time-fractional inhomogeneous nonlinear diffusion equation: Symmetries, conservation laws, invariant subspaces, and exact solutions. *Mod Phys Lett B*. 32:1850401. 10.1142/s0217984918504018, 2018,
- [4] Choudhary S, Prakash P, Varsha DG. Invariant subspaces and exact solutions for a system of fractional PDEs in higher dimensions. *Comput Appl Math* 38:126. 10.1007/s40314-019-0879-4, 2019,
- [5] Sahadevan R, Bakkyaraj T. Invariant subspace method and exact solutions of certain nonlinear time fractional partial differential equations. *Fract Calc Appl Anal* 18: 10.1515/fca-2015-0010, 146–62, 2015,