

International Conference on Applied Analysis and Mathematical Modeling
ICAAMM17, July 3-7, 2017, Istanbul-Turkey

**Application of Wavelet-Galerkin Approximation Techniques on the Partial
Differential Equations via Maple**

Aydin Secer and Mustafa Bayram

Yildiz Technical University, Dept. of Mathematical Engineering, 34220, Istanbul, Turkey
Istanbul Gelisim University, Engineering and Architecture Faculty, 34320, Avcilar-Istanbul, Turkey
E-mail: asecer@yildiz.edu.tr and mbayram@gelisim.edu.tr

Abstract: We have studied wavelet Galerkin approximation techniques for differential equations in a detailed manner. It has been discussed what the advantages and disadvantages of wavelet basis are when they are used in the solution of ODE's and PDE's with Galerkin method, some boundary and initial conditions. A computational examples given at the end of study and simulated solutions of some problems via Maple Computer Algebra System.

References

- [1] Mani Mehra, "Wavelets and Differential Equations-A short review", Department of Mathematics, Indian Institute of Technology, New Delhi, India, 2009.
- [2] Mehmet Ali Akinlar, Aydin Secer, "Wavelet-Petrov-Galerkin Method for Numerical Solution of Boussinesq Equation", International Conference on Chemical, Mechanical and Materials Engineering, Melbourne, AUSTRALIA, (2013)
- [3] I. Christov, "On the Wavelet-Galerkin Solution to the Korteweg-de Vries Equation", Wavelets and Matrix Analysis: REU/VIGRE Student Mini-Conference, 2004.
- [4] Alpert, B. and Beylkin, G. and Gines, D. and Vozovoi, L., "Adaptive solution of partial differential equations in multiwavelet bases", J. Comput. Phys., 182(1), pp. 149-190, 2002.
- [5] I. Daubechies, Comm. Pure Appl. Math. 41, 909, 1988.
- [6] S. Mallat, "A wavelet tour of signal processing", Academic Press, 2008.
- [7] S. G. Mallat, Trans. Amer. Math. Soc. 315, 69, 1989.
- [8] G. Strang, SIAM Rev. 31, 614, 1989.