

“PAPER FOR YOUNG SCIENTIST AWARD”

**ARRHENIUS CONTROLLED HEAT TRANSFER FLOW
ANALYSIS IN A MICROCHANNEL BY USING FIBONACCI
WAVELET FRAME OPERATIONAL MATRIX**

Vidya Shree R

Department of Studies and Research in Mathematics, Tumkur University, Tumkur-572103, Karnataka, India.

ABSTRACT

In this article, the new functional matrix of integration using Fibonacci wavelet has been developed and proposed a novel technique called Accurate Fibonacci wavelet frame operational matrix method. The current study analyzes the implications of an Arrhenius-controlled heat transfer fluid on free convection in a microchannel by using Fibonacci wavelet frame operational matrix method. Velocity, Temperature, IMF and volume flow rate are analyzed graphically for various values of physical parameters. Thermo-physical properties that are of Engineering interest, like shear stress and Nusselt number are also computed and displayed. The accurate Fibonacci wavelet approach has been devised to solve the non-linear coupled governing equations. This technique finds the numerical solution without any restrictive assumptions and avoids round-off errors. The numerical solutions attained by the proposed scheme point out that the approach is easy to implement and computationally elegant. The validity of the Fibonacci Wavelet Frame Matrix (FWFM) is ascertained by comparing our results with the other previous methods.