THERMAL ANALYSIS OF CONVECTIVE FIN WITH TEMPERATURE DEPENDENT INTERNAL HEAT GENERATION AND THERMAL CONDUCTIVITY BY USING ADOMIAN DECOMPOSITION SUMUDU TRANSFORM METHOD

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Abstract— In this paper, Adomian Decomposition Sumudu Transform Method (ADSTM) is used to solve the fractional order energy balance equation to find the temperature distribution and fin efficiency in a longitudinal fin with temperature dependent internal heat generation and thermal conductivity. The concept behind the use of ADSTM is to derive a solution of the fractional order energy balance equation. Here we studied the variation of temperature distribution with internal heat generation for different values of embedding parameters and compared the obtained results with the results obtained through Differential Transformation Method (DTM) (Ghasemi et al. 2014) as well as with numerical results to check the accuracy of the method.

Keywords— ADSTM, Convective fin, Temperature distribution, Fin efficiency, Internal heat generation, Fractional differential equation.