

A Mathematical Model of Blood Perfusion Dependent Temperature Distribution in Transient Case in Human Dermal Region

Authors : Yogesh Shukla

Abstract : Many attempts have been made to study temperature distribution problem in human tissues under normal environmental and physiological conditions at constant arterial blood temperature. But very few attempts have been made to investigate temperature distribution in human tissues under different arterial blood temperature. In view of above, a finite element model has been developed to unsteady temperature distribution in dermal region in human body. The model has been developed for one dimension unsteady state case. The variation in parameters like thermal conductivity, blood mass flow and metabolic activity with respect to position and time has been incorporated in the model. Appropriate boundary conditions have been framed. The central difference approach has been used in space variable and trapezoidal rule has been employed a long time variable. Numerical results have been obtained to study relationship among temperature and time.

Keywords : rate of metabolism, blood mass flow rate, thermal conductivity, heat generation, finite element method

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020