

The Study of Numerical Method for Heat Transfer in Living Tissue Insulated by Protective Clothing

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Abstract

Skin is an important organ which contains thermal sensors that takes part in the thermoregulatory control. Protective Clothing, on the other hand is used outside the skin that plays a vital role working as thermal insulation and controlling the heat transfer in the human body. The human thermal comfort is affected by body's heat exchange mechanism conduction convection, radiation and evaporation. The mode of heat transfer between these two different materials depends on the thickness of clothes and the boundary conditions. The main aim of this paper is to study numerical solution of one dimensional Pennes' bio-heat equation with appropriate boundary conditions. The solution is used to observe the heat transfer in the living tissue specially in the human body insulated by protective clothing. Various Physical and physiological factors across the layers of skin along with clothing area factors and clothing insulation in the protective layer have been incorporated in the model. These results are illustrated in graph to clear that the protective layers maintain a suitable temperature at the skin surface no matter of the outside temperature.