

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

THERMAL ANALYSIS OF BIO-HEAT EQUATION FOR
HYPERTHERMIA TREATMENT

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Abstract

Hyperthermia treatment is one type of thermal therapy that is used in treating diseases like cancer and tumor. This therapy is based on heat transfer process that occurs within biological tissue. To perform this therapy, the time-span needed is depends on the location of the infected tissue. The deeper the infected tissue from the skin surface, the longer the duration of this therapy took place. Since human body cannot withstand an excessive amount of heat, to regulate the heat that enters and leaves the human body is important because any undesired consequences such as heat stroke can be minimized after the therapy is done. Therefore, the objective of this study is to analyze the temperature distribution during hyperthermia treatment using bio-heat equation. This equation will be solved using MATLAB's built-in solver, pdepe and the aid of GUI will be used to explain the graphical behavior of the equation. The result shows that, if the location of the cancerous tissue is far away from the skin surface, the time needed for the skin surface to be exposed to a radiation must be longer and the radiation power transmitted to the Micro-electromagnetic radiator should be lower than 30 W. The goal of the cancer treatment is to abolish as many malignant cells as possible without damaging other normal cells. Therefore, higher radiation power is not suitable to be used in performing hyperthermia treatment with longer period of time as it will cause the temperature distribution within skin tissue raised drastically.

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