

Tumor location and parameters estimation by thermography

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In non-invasive thermal diagnostics, accurate correlations between the thermal image on skin surface and interior human pathophysiology are often desired, which require general solutions for the bioheat equation. In this talk, a difference scheme method for the Pennes equation with a space-dependent thermal physiological parameters and convective boundary condition on the top surface, was used to approximate the solution. Details computations indicated that the thermal states of biological bodies, reflecting physiology conditions, could be correlated to the temperature mapping recorded at the skin surface. The effect of the convective heat transfer coefficient, the temperature of the surrounding air, the metabolic rate, the blood perfusion rate in the tumor and the tumor size are investigated.

Moreover the inverse problems consisting in the simultaneous estimation of unknown parameters of the tumor are solved. On the stage of numerical solution the pattern search algorithm coupled with the difference scheme method has been applied.