Abstracts

Optimal Temperature Control with Phased Array Hyperthermia System

M. Knudsen and U. Hartmann. "Optimal Temperature Control with Phased Array Hyperthermia System." 1986 Transactions on Microwave Theory and Techniques 34.5 (May 1986 [T-MTT] (Special Issue on Phased Arrays for Hyperthermia Treatment of Cancer)): 597-603.

A strategy for controlling the temperature distribution in tissue, irradiated by a phased array of RF applicators, described. Using the amptitudes and relative phases from the individual applicators as control inputs, feedback control is established from a corresponding number of measured tissue temperatures. Optimal control theory based on a state-space model of the thermal process is used for designing the multi-variable self-toning controller. Simulations of the two-dimensional temperature distribution in cylindrical homogeneous muscle tissue indicate that it is possible to place a temperature maximum near a given point and to maintain therapeutic temperatures in a specified tumor area while the temperatures in the surrounding tissue are lower.

❑ Return to main document.