6. 結論

本文考量奈米磁粒濃度分布的空間變動性，引用傅立葉熱傳導模式、熱波模式與相補延遲模式分析癌瘤電磁熱治療問題。探討非均勻熱源效應與生物熱傳遞模式的差異性，由於奈米磁粒會從瘤流體注入點開始成徑向擴散，本問題已發展成球座標系統之非傅立葉生物熱傳遞問題。基本上，解析解座標系統之非傅立葉生物熱傳遞問題具有數學困難度。所要面對的問題，發生在複層結構，涉及物理性能的差異性，並帶有高斯分布空間熱源，所需克服數學困難度將增高。本文應用座標轉換技巧，將問題轉換成矩形座標系統問題。之後，以拉氏轉換技巧將暫態問題轉換成穩態型式，進而得到拉氏轉換後之統制方程式能順利進行各項分析工作。

7. 致謝

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8. 參考文獻


Analysis of Temperature Response for Magnetic Tumor Hyperthermia

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ABSTRACT

For more complete results and helpfulness on the development of cancer therapy, this study was executed with a space-dependent spherical heat source and the use of Fourier, the Dual-Phase-Lag, and the thermal wave models for magnetic tumor hyperthermia. Comparison among bio-heat transfer models and investigation to the effects of space-dependent heat source has been made. The magnetic nanoparticles diffuse form the injected location in the radial direction, so the present problem becomes the bio-heat transfer problem in spherical coordinate. Essentially, there exists the mathematical difficulty for solving the non-Fourier bio-heat transfer problem in spherical coordinate. The mathematical difficulty of the present problem absolutely increases for the difference of the thermo-physical parameters between two layers and the Gaussian distribution source. The analysis method must be further developed.

Keywords: hyperthermia；bio-heat transfer；non-Fourier