ON A HIERARCHY OF MODELS FOR ELECTRICAL CONDUCTION IN BIOLOGICAL TISSUES

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ABSTRACT. In this paper we derive a hierarchy of models for electrical conduction in a biological tissue, which is represented by a periodic array of period \( \varepsilon \) of conducting phases surrounded by dielectric shells of thickness \( \varepsilon \eta \) included in a conductive matrix. Such a hierarchy will be obtained from the Maxwell equations by means of a concentration process \( \eta \to 0 \), followed by a homogenization limit with respect to \( \varepsilon \). These models are then compared with regard to their physical meaning and mathematical issues.

KEYWORDS: Homogenization, Asymptotic expansion, Dynamical condition, Electrical conduction in biological tissues.
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