

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 ε 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 $\eta \rightarrow 0$, followed by a homogenization limit with respect to ε . 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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