

## Overall Properties of Periodic Biocomposites

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The problem of predicting the electromechanical properties of composites whose constituents are biomaterials is addressed in this paper. A two-phase parallel fiber-reinforced periodic composite is considered here in either a square or hexagonal array. The materials are anisotropic. Their electroelastic properties are taken to belong to the hexagonal system, classes 622 or 6. The fiber cross-section is circular. Simple closed-form formulae are obtained for the overall properties of the composite using the asymptotic homogenization method. The local problems that arise upon the application of this method are solved using potential theory of a complex variable and properties of doubly periodic elliptic functions of periods  $1, i$  ( $1, \exp(i\pi/3)$ ) for a square (hexagonal) array. Some examples of the numerical results will be shown for several combinations of biomaterials, such as, collagen, collagen-hydroxyapatite, hydroxyapatite, etc. of interest in medical applications.

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