

Thermoelasticity of damaged elastomers - symmetry issues

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Abstract. The paper deals with an elastomer body having a random 3D-distribution of two phase inclusions: spheroidal mutually parallel voids as well differently oriented reinforcing parallel elastomeric stiff spheroidal short fibers. By the effective field approach the effective stiffness 4-tensor as well as the effective thermal expansion 2-tensor are formulated and found numerically. Simultaneous and sequential embeddings of inclusions are compared. A special attention is paid to the problem of effective elastic and thermal symmetry. The results of the theory are applied to two families of inclusions (having either prolate fibres or oblate voids).

Keywords: Elastic and thermal effective anisotropy, self consistent effective field method, Eshelbian inclusions.