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CONSTITUTIVE MODELLING OF BIOPOLYMER AEROGELS

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Biopolymer aerogels exhibit a highly open-cellular nanoporous morphology, wherein the network consists of three-dimensionally interconnected fibres. In the first part of this contribution, constitutive modelling of such materials will be discussed, wherein the network is assumed to be made of square-shaped pores whose pore sizes correspond to the experimental pore-size distributions [1]. Within the same framework of the constitutive model, an approach to characterise the densification will be elucidated [2]. Given recent potential of applying such materials in tissue engineering, their mechanical and structural properties under wet conditions become interesting. An approach to extend the previously proposed constitutive model for characterising the properties under wet conditions will be described [3, 4]. All model results will be compared against the experimental data to demonstrate the validation of the proposed models.

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