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A.P.S. Selvadurai , A.P. Suvorov

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# On the Inflation of Poro-Hyperelastic Annuli

A.P.S. Selvadurai\* and A.P. Suvorov\*\*

Department of Civil Engineering and Applied Mechanics

McGill University

817 Sherbrooke Street West, Montréal, QC, Canada H3A 0C3

## ABSTRACT

The paper presents the radially and spherically symmetric problems associated with the inflation of poro-hyperelastic regions. The theory of poro-hyperelasticity is a convenient framework for modelling the mechanical behaviour of highly deformable materials in which the pore space is saturated with fluids. Including the coupled mechanical responses of both the hyperelastic porous skeleton and the fluid is regarded as an important consideration for the application of the results, particularly to soft tissues encountered in biomechanical applications. The analytical solutions for radially and spherically symmetric problems involving annular domains are used to benchmark the accuracy of a standard computational approach. The paper also generates results applicable to the hyperelastic solutions when coupling is eliminated through the presence of a highly permeable pore structure.

## Keywords:

Poro-hyperelasticity, Fluid-saturated media, Canonical analytical solutions, Large deformations, Time-dependent phenomena, Calibration of computational results

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\* *William Scott Professor and James McGill Professor*

Corresponding author e-mail address: [patrick.selvadurai@mcgill.ca](mailto:patrick.selvadurai@mcgill.ca)

\*\* *Research Associate in Applied Mechanics*

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