

## **Analysis of Navier-Stokes models for flows in bidisperse porous media**

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### **Abstract**

Having in view a model proposed by Nield and Kuznetsov (2005, 2013), we consider a more general system of coupled Navier-Stokes equations in the incompressible case subject to the homogeneous Dirichlet condition in a bounded domain. Due to its generality, this system can be regarded as a new model for fluid flows in bidisperse porous media. We provide a deep theoretical analysis for large classes of equations and coupled systems of Navier-Stokes type with various non-homogeneous terms of reaction type. Existence results are obtained by using a variational approach making use of several fixed point principles and matrix theory.