A mathematical model for blood flow and mass transport by a drug eluting stent

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Abstract

We propose a fully coupled model for the description of blood flow and mass transport by a drug eluting stent in blood vessels. We consider the steady state Navier-Stokes equations to describe the blood flow in the lumenal region coupled with the Darcy equations to describe plasma filtration in the arterial wall and in the polymeric region of the stent. The drug release model is governed by advection and non-Fickian diffusion [1, 2]. In order to obtain a numerical solution of the problem, we use an iterative splitting scheme over a stabilized finite element method together with Nitsche type penalty method for the coupling between different local sub-problems [3, 4]. Numerical experiments to show the effectiveness of the method will be presented.

Keywords: Drug delivery, non-Fickian, penalty methods.

References

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