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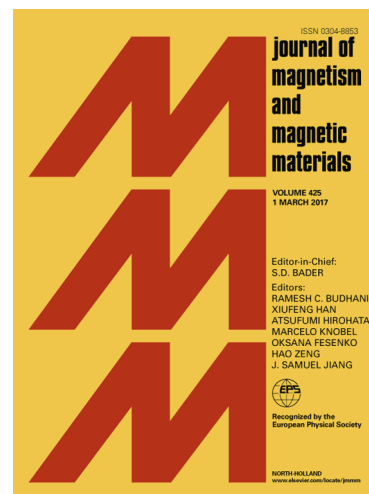
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Numerical study of biomagnetic fluid flow in a duct with a constriction affected by a magnetic field

S. Morteza Mousavi¹, A. Ali Rabienataj Darzi², Omid ali Akbari³, Davood Toghraie^{4,*}, Ali Marzban⁵

¹Faculty of Mechanical Engineering, Babol University of Technology, Babol, Iran

²department of mechanical engineering, university of mazandaran, iran.

³Young Researchers and Elite Club, Khomeinishahr Branch, Islamic Azad University, Khomeinishahr, Iran

⁴Department of Mechanical Engineering, Khomeinishahr Branch, Islamic Azad University, Khomeinishahr, Iran

⁵Department of Mechanical Engineering, Aligoudarz Branch, Islamic Azad University, Aligoudarz, Iran

*Corresponding author: Davood Toghraie, Department of Mechanical Engineering, Islamic Azad University, Khomeinishahr Branch, Khomeinishahr 84175-119, Iran

Email: Toghraee@iaukhsh.ac.ir

Abstract

In this paper, the influence of a non-uniform magnetic field on biomagnetic fluid flow in a duct with a constriction is investigated numerically. The magnetic field is generated by a wire carrying electric current located outside the duct. The biomagnetic fluid dynamics model, which is based on the ferrohydrodynamics and magnetohydrodynamics, is used to study the fluid flow, and a computational grid properly covering the magnetic field is used for the simulation. In this investigation, the influence of magnetic field on biomagnetic fluid flow in various percentages of the duct constriction, and the effect of the magnetic field on the biomagnetic fluid flow in various strengths of magnetic force are studied. The magnetic field is spatially varying, and the magnetic field strength decreases by increasing the distance from the wire carrying electric current which is the magnetic source. The results show that, the influence of the magnetic field on biomagnetic fluid flow is considerable near the magnetic source. Applying the magnetic field with enough strength causes the recirculation areas downstream of constriction to become

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