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Influence of localized magnetic field and strong viscosity on the biomagnetic fluid flow in a rectangular channel

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Highlights

- In this paper biomagnetic fluid flow in an enclosure of rectangular channel is considered.
- The flow is under the influence of applied magnetic field and temperature-dependent viscosity variations.
- An electrically conducting magnetic fluid (blood) is discussed which also exhibits magnetization.
- The governing equations are converted in stream function-vorticity-temperature formulation.
- Solutions are obtained numerically by employing upwind scheme together with successive over relaxation.
- Solutions are presented in terms of average Nusselt number, streamlines, isotherms, and vorticity function contours.
- Presence of magnetic source and viscosity variations influences the flow field considerably.
- It is observed that the strength of the vortices and the temperature values increases by magnifying the magnetic intensity and circular contours are generated extensively for the fluid having variable viscosity.

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