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The velocity field of second-order Rivlin-Ericksen fluid between two parallel porous plates rotating around two different axes but with the same angular velocity. (English)

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Summary: The steady state velocity field of an incompressible, second-order Rivlin-Ericksen fluid between two parallel, planar porous plates rotating around different axes at same angular velocity is analyzed. In addition to the rotating flow between two plates, there exists another flow of the same fluid between two plates which is perpendicular to plates. Since the distance between the plates is very small if compared to the dimensions of the plates, the dimensions of the plates are assumed to be infinite. The paper differs from the existing relevant literature by the assumption of a non-vanishing normal stress module: $\alpha_1 + \alpha_2 \neq 0$. The porous character of plates and the non-linearity of the fluid increase the order of the differential equation (it increases up to the fourth-order). By obtaining the exact solution of the problem using kinematic parameters it has been tried to bring a new aspect to researches in the same field.

MSC:

76S05 Flows in porous media; filtration; seepage

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