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Global regularity for a 3D Boussinesq model without thermal diffusion. (English)

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Summary: In this paper, we consider a modified three-dimensional incompressible Boussinesq model. The model considered in this paper has viscosity in the velocity equations, but no diffusivity in the temperature equation. To bypass the difficulty caused by the absence of thermal diffusion, we make use of the maximal $L_t^p L_x^q$ regularity for the heat kernel to establish the global regularity result.

MSC:

35Q35 PDEs in connection with fluid mechanics

35B65 Smoothness and regularity of solutions to PDEs

76D05 Navier-Stokes equations for incompressible viscous fluids

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