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MICROPOLAR FLUID TO MODEL 2D HEAT TRANSFER ENHANCEMENT IN NANOFLUIDS

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Micropolar fluids are a generalization of the Navier-Stokes equations of classical hydrodynamics [1, 2]. Taking into account effects of microstructures at the continuum scale, we discretize the system of equations coming from the conservation laws. We use divergence-conforming B-spline spaces for the discrete velocity-pressure fields pair, guaranteeing the inf-sup stability condition and a point-wise divergence free discrete velocity field [3, 4]. We tested our implementation using manufactured solutions obtaining optimal convergence rates. As test cases we used the heat-driven cavity problem [5] and also reproduce experimental results from literature.

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