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Title: Micro-rotation and Vorticity in Micropolar Flows

Abstract: The spontaneous synchronization between micro-rotation and vorticity in micropolar flows in \mathbb{R}^n ($n = 2; 3$) is investigated and used to explain the faster decay by $t^{-1/2}$ of the angular velocity of the fluid particles' microrotation, as well as establishing its optimality. This synchronization effect remained elusive for sixty years of investigations in micropolar fluid flows and was revealed after important upper and lower bounds for the solutions in $\dot{H}^m(\mathbb{R}^n)$ were obtained by the authors using monotonicity ideas. Several related results of independent interest are also given along the discussion.

It is a joint work with R. Guterres (UFRGS), C. Niche (UFRJ), W. Melo (UFS) and Paulo Zingano (UFRGS).