On the self-organized hydrodynamic models of collective motions

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The self-organized hydrodynamics model of collective behavior is studied on an annular domain. A modal analysis of the linearized model around a perfectly polarized steady-state is conducted. It shows that the model has only pure imaginary modes in countable number. Numerical computations of the low-order modes are provided. The fully non-linear model is numerically solved and nonlinear mode-coupling is then analyzed. Finally, the efficiency of the modal decomposition to analyze the complex features of the nonlinear model is demonstrated.