Sign changes in the eddy viscosity of two-dimensional incompressible flow

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Multiscale techniques is set of important mathematical tools that allows us to compute large scale transport coefficients providing that certain symmetries on the basic flow are met.

In two-dimensional incompressible fluids, if the basic flow is parity invariant and six-fold rotation symmetric, we show that the dlog-Pad approximants reveal several sign change of the eddy viscosity (from positive-to-negative and negative-to-positive values).

All of the computing is done in Mathematica. For this purpose, we also present an algorithm which allows us to compute the inverse of the two-dimensional Laplacian operator restricted to periodic functions.