Abstract Submitted
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Numerical investigation of the model on vortex reconnection YOSHIFUMI KIMURA, Nagoya University, KEITH MOFFATT, University of Cambridge — Recently we have developed an analytical model for the finite singularity problem for the Naiver-Stokes equations [1],[2]. In this model, two circular vortex rings of circulation $\pm\Gamma$ and radius $R = 1/\kappa$ are symmetrically placed on two planes inclined to the plane $x = 0$ at angles $\pm\alpha$. Under an assumption that the vortex Reynolds number, $R_\Gamma = \Gamma/\nu$, is very large, we have derived a nonlinear dynamical system for the local behavior near the points of closest approach of the vortices. Careful numerical investigation of the dynamical system reveals that the magnitude of vorticity could take any large value for small viscosity but remains finite since the minimum core radius never becomes zero. The assumptions for this analysis are far beyond the ones that the current DNS could attain, but we are curious whether and how much DNS can verify the tendency of the analysis. We are going to show some preliminary results of DNS. [1] Towards a finite-time singularity of the Naiver-Stokes equations Part 1. Derivation and analysis of dynamical system, H.K.M. & Y.K. JFM (2019) **861** 930967. [2] Towards a finite-time singularity of the Naiver-Stokes equations Part 2. Vortex reconnection and singularity evasion, H.K.M. & Y.K. JFM (2019) **870**, R1.

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