

Abstract Submitted
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Insights into vortex merger using the core growth model FANGXU JING, Georgia Institute of Technology, EVA KANSO, PAUL NEWTON, University of Southern California — We revisit the two vortex merger problem (both symmetric and asymmetric) for the Navier-Stokes equations using the core growth model for vorticity evolution coupled with the passive particle field and an appropriately chosen time-dependent rotating reference frame. Using the combined tools of analyzing the topology of the streamline patterns along with careful tracking of passive fields, we highlight the key features of the stages of evolution of vortex merger, pinpointing deficiencies in the low-dimensional model with respect to similar experimental/numerical studies. The model, however, reveals a far richer and delicate sequence of topological bifurcations than has previously been discussed in the literature for this problem, and at the same time points the way towards a method of improving the model.

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