

Abstract Submitted
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Where Does Vorticity Annihilation Occur? JAMES SCHULMEISTER, MICHAEL TRIANTAFYLLOU, MIT — Accounting vorticity, from generation at boundaries, diffusion and convection in the fluid, to finally annihilation, is critical to understanding vortical flows. This study presents a complete accounting of vorticity, including annihilation. Control volume analysis leads to the concept of the vorticity annihilation line, which is the locus of points where vorticity annihilates. This study considers two examples. The first is the flow above a plane that oscillates harmonically in its plane. This flow supports a quasi-steady analytic solution and is driven by diffusion. The second is the flow past a circular cylinder with Reynolds number equal to 10. This flow supports a steady solution that is solved numerically and is driven by both diffusion and convection of vorticity. In both examples, the vorticity is fully accounted from generation to annihilation using the annihilation line concept.

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