Maxial Enstrophy Generation in the 3D Navier-Stokes Equations[1] CHARLES R. DOERING, LU LU[2], University of Michigan — We address the following question for the 3D incompressible Navier-Stokes equations in a periodic domain: given an enstrophy budget, what incompressible flow field with that amount of enstrophy instantaneously maximizes the enstrophy generation rate? By solving the associated variational problem we have found flows that saturate the functional-analytic estimates (bounds) for the maximal rate of enstrophy production. We discuss implications of these results for the open question of existence and uniqueness of smoooth solutions of the 3D Navier-Stokes equations.

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