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Moe Ebrahimi, Michael Holst, Evelyn M. Lunasin* (elunasin@math.ucsd.edu) and
Edriss S. Titi. *The 2D Navier-Stokes-Voight and 2D damped Navier-Stokes equations for image inpainting.*

In 2001, Bertalmio, et. al. have built an analogy between the image intensity function for the inpainting problem and the stream function in 2D incompressible fluid. The solution to the inpainting problem is obtained by solving the steady state solution of the 2D NSE vorticity transport equation, and simultaneously solving the Poisson problem between the vorticity and the stream function, in the region to be inpainted. From this analogy one can investigate the quality and efficiency of a sub-grid scale turbulence model in the context of image inpainting. For small regularization parameter $\alpha > 0$, our numerical results show that the 2D Navier-Stokes-Voight equation gives a solution to the inpainting problem which is comparable with NSE (both in using subjective and objective measures) but requires reduced computational resources. A similar result holds true for the 2D damped NSE for a small damping coefficient. (Received February 28, 2009)