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$2D/3C$ **Model of Turbulence in Plane Couette Flow** DENNICE GAYME, BEVERLEY MCKEON, California Institute of Technology, ANTONIS PAPACHRISTODOULOU, University of Oxford, JOHN C. DOYLE, California Institute of Technology — Given the consensus that turbulent flow is characterized by coherent structures and observations of streamwise-elongated structures in numerical simulations and experiments (in the near wall region), we model the mean behavior of fully developed turbulent plane Couette flow using a streamwise constant projection of the Navier Stokes (NS) equations, (the so-called $2D/3C$ model). The unforced $2D/3C$ model has been analytically shown to have a single globally stable solution. This property lends to analysis of the system using tools from robust control theory where one can represent model uncertainties or experimental errors through the addition of noise forcing. In the present work this nonlinear $2D/3C$ model is driven with small amplitude stochastic noise to produce fully developed turbulent plane Couette flow with low order statistics that are qualitatively consistent with experiments. The large scale features of the resulting flow are compared to both experiments (Kitoh and Umeki 2008) and DNS data (Tsukahara, Kawamura and Shingai 2006).

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