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Shear-induced chaos via stochastic forcing: A tale of finding positive Lyapunov exponents

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We discuss the phenomenon of shear-induced chaos, coined by Wang and Young about twenty years ago and referring to chaotic behavior as a result of shear being magnified by some forcing, in the context of stochastic perturbations. As a latest result, we show the positivity of Lyapunov exponents for the normal form of a Hopf bifurcation, perturbed by additive white noise, under sufficiently strong shear strength. This completes a series of related results for simplified situations which we can exploit by studying suitable limits of the shear and noise parameters. Some general ideas concerning conditioned random dynamics, computer-assisted proofs and continuity of Lyapunov exponents will be highlighted along the way.