Abstract Submitted
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Stability of large systems[1] HAROLD HASTINGS, Hofstra University — We address a long-standing dilemma concerning stability of large systems. MacArthur (1955) and Hutchinson (1959) argued that more "complex" natural systems tended to be more stable than less complex systems based upon energy flow. May (1972) argued the opposite, using random matrix models; see Cohen and Newman (1984, 1985), Bai and Yin (1986). We show that in some sense both are right: under reasonable scaling assumptions on interaction strength, Lyapunov stability increases but structural stability decreases as complexity is increased (c.f. Harrison, 1979; Hastings, 1984). We apply this result to a variety of network systems. References: Bai, Z.D. & Yin, Y.Q. 1986. Probab. Th. Rel. Fields 73, 555. Cohen, J.E., & Newman, C.M. 1984. Annals Probab. 12, 283; 1985. Theoret. Biol. 113, 153. Harrison, G.W. 1979. Amer. Natur. 113, 659. Hastings, H.M. 1984. BioSystems 17, 171. Hastings, H.M., Juhasz, F., & Schreiber, M. 1992. .Proc. Royal Soc., Ser. B. 249, 223. Hutchinson, G.E. 1959. Amer. Natur. 93, 145, MacArthur, R. H. 1955. Ecology 35, 533, May, R.M. 1972. Nature 238, 413.

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