Stability of large complex systems[1] HAROLD HASTINGS, Hofstra
University — We use a random matrix model to study the stability of large, complex systems. Our approach was motivated by 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. In prior work we showed 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 now apply these methods to a variety of complex systems.

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