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**Energy Spectrum of Complex Systems Control** GEORGIOS TSEKENIS, Northeastern University, BARUCH BARZEL, YANG-YU LIU, Northeastern University and Harvard Medical School, JEAN-JACQUES SLOTINE, Massachusetts Institute of Technology, ALBERT-LASZLO BARABASI, Northeastern University and Harvard Medical School — Understanding how to control a complex network is a fundamental scientific question with a wealth of potential applications in man-made and natural systems. When controlling a complex system one has to steer it from one point of its state space to another by an appropriate set of inputs. The state space complex systems operate in is high-dimensional with dimensionality equal to the system's size. The energy of control across directions span several decades of orders of magnitude exhibiting an extremely wide range. The control energy spectrum is dominated by a fat-tail that is largely independent of the properties of the network. As a result control is easy in most directions while it is very hard in few of them. Naturally the energy of control decreases by increasing the number of driver nodes.

Georgios Tsekenis  
Harvard University

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