Response to disturbance and abundance of final state in logistic map[1] DAN SHEN, WEN-XIU WANG, YU-MEI JIANG, YING-MEI WANG, DA-REN HE, Yangzhou University — We propose a new definition of complexity. It is our hope that this definition can describe a clear boundary between simple systems and complex systems by showing that all the simple systems have zero complexity, and all the complex systems have positive complexity. The idea is that when a system evolves to a final state via a transient state, its complexity depends on the abundance of both the final state and the transient state. The abundance of the transient state may be described by the diversity of the response to disturbance. Complexity values of some example simple systems are analytically discussed. All the results show zero values. As examples for complex systems, numerically we discussed the complexity values of logistic map. The results show complexity values beyond zero in chaotic states. All the maximal values locate at the edges of chaos.

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