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Input-to-state stability for discrete-time nonlinear systems. (English) Zbl 0989.93082

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The present work studies the input-to-state stability (ISS) for discrete-time nonlinear systems. The ISS property means that for a bounded control, the state trajectory is bounded and the state becomes small if the input is small independent from the initial state. The authors equivalently characterize the ISS by the existence of a smooth ISS-function and show that many recent results related to ISS for the continuous time case find their analogue in discrete time. In this spirit, the small-gain theorems are presented to treat the ISS-stabilization for interconnected systems. The ISS stabilizability is characterized by the existence of a continuous feedback.

Reviewer: **Juri Hinz (Mössingen)**

MSC:

93D25 Input-output approaches in control theory

93C55 Discrete-time control/observation systems

93C10 Nonlinear systems in control theory

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Keywords:

input-to-state stability; discrete-time nonlinear systems; small-gain theorems; continuous feedback

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