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Monotonicity and Comparison Results for Non-negative Dynamic Systems. Part I: Discrete-Time Case

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Abstract: In two subsequent parts, Part I and II, monotonicity and comparison results will be studied, as generalization of the pure stochastic case, for arbitrary dynamic systems governed by nonnegative matrices.

Part I covers the discrete-time and Part II the continuous-time case. The research has initially been motivated by a reliability application contained in Part II.

In the present Part I it is shown that monotonicity and comparison results, as known for Markov chains, do carry over rather smoothly to the general nonnegative case for marginal, total and average reward structures. These results, though straightforward, are not only of theoretical interest by themselves, but also essential for the more practical continuous-time case in Part II (see [**?**]). An instructive discrete-time random walk example is included.

Keywords: Markov chains; monotonicity; nonnegative matrices;

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