

**Title:** Applications of System Signatures in Engineering Reliability

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**Abstract:** The signature of a coherent system with  $n$  components having i.i.d. lifetimes  $X_1, \dots, X_n$  is a probability vector whose  $i$ th element is  $s_i = P(T = X_{i:n})$ , where  $T$  is the lifetime of the system and  $X_{i:n}$  is the  $i^{\text{th}}$  smallest  $X$ . Introduced by Samaniego (IEEE-TR, 1985) in the context of studying closure theorems in Reliability, signatures have been used since in a wide variety of applications, including the characterization of the performance of engineered systems, the comparative analysis of systems, the analytical treatment of optimization problems in Reliability Economics, the study of communication networks and varied inference problems arising in life testing. An overview of the theory of system signatures will be given, and three specific applications will be highlighted (including one that Michelle Norris hasn't seen before). Collaborators on this varied work include: N. Balakrishnan, D. Bhattacharya, H. Block, P. Boland, M. Dugas, S. Kochar, M. Hollander, H. Mukerjee, J. Navarro and E. Vestrup.