Nonparametric predictive inference for system failure time using a generalization to the system signature

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We present nonparametric predictive inference (NPI) for the failure time of a system, which can consist of different types of components. It is assumed that, for each type of component, additional components which are exchangeable with those in the system have been tested and their failure times are available. NPI is based on few modelling assumptions and here leads to lower and upper survival functions. To model the system structure, we present an alternative to the system signature which, in contrast to the signature, is straightforwardly applicable to systems with multiple types of components. We also show how bounds for the NPI lower and upper survival functions can be derived based on limited information about the system structure, which can reduce computational effort substantially for specific inferential questions.