Summary: We consider forecasting in systems whose underlying laws are uncertain, while contextual information suggests that future system properties will differ from the past. We consider linear discrete-time systems, and use a non-probabilistic info-gap model to represent uncertainty in the future transition matrix. The forecaster desires the average forecast of a specific state variable to be within a specified interval around the correct value. Traditionally, forecasting uses a model with optimal fidelity to historical data. However, since structural changes are anticipated, this is a poor strategy. Our first theorem asserts the existence, and indicates the construction, of forecasting models with sub-optimal-fidelity to historical data which are more robust to model error than the historically optimal model. Our second theorem identifies conditions in which the probability of forecast success increases with increasing robustness to model error. The proposed methodology identifies reliable forecasting models for systems whose trajectories evolve with Knightian uncertainty for structural change over time. We consider various examples, including forecasting European Central Bank interest rates following 9/11.

MSC:

91B84	Economic time series analysis
90B50	Management decision making, including multiple objectives

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Keywords:

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