Approximate DegradationModel for Large*k*-out-of-*n*Pairs:G Balanced System

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Abstract –*k*-out-of-*n*pairs:G Balanced system has many important applications such asdescent propulsion system and Unmanned Aerial Vehicles (UAV). Degradation analysis considering operating conditionsprovides accurate reliability metricsof such systems. However, degradation analysis for such systems requires complex modeling and high computation load due to the combinatorics of the system configuration. When the number of units in the system increases,the high computational complexity becomes a barrier for obtaining thereliability metrics evaluation. In this paper, we develop an approximate degradation model to estimate the reliability metrics for large *k*-out-of-*n*pairs:G Balanced systems with high accuracy and short computationaltime. Numerical examples validate the accuracy and efficiency of the approximation.