Availability Analysis of a Two-Component Parallel System under Stochastic Dependence

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Abstract

Research in maintenance engineering is increasingly focusing on complex systems in which components are subject to various dependencies, such as stochastic, structural, and economic dependences. This paper proposes a mathematical approach to calculate system's availability with stochastic dependence and assesses its effect on the system. From this perspective, Cox Proportional Hazards Model (CPHM), based on the exponential survival distribution, is used. The results show that increasing the degree of dependence impacts, considerably, system availability.

Biography

Nizar El Hachemi received his PhD in Operation Research from Polytechnic School of Montreal. Currently, he is a Professor at EMI. Recently, he was promoted to the rank of HDR. He developed hybrid solution methods for solving transportation problem encountered in forestry by taking advantage of constraint programming, constraint-based local search and linear integer programming. Recently, he has developed effective heuristic integrators for solving rich problems in collaboration with several researchers from the Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation (CIRRELT).

Abdessamad Ait El Cadi: Engineer from the Ecole Nationale des Ponts et Chaussées, with a MSc.A. & Ph.D. degrees in Industrial Engineering from Ecole Polytechnique de Montreal, he is also member of the association "Anciens ENPC (Ecole Nationale des Ponts et Chaussés)", member of ISG - Institute of Sound Management, Member of the OIQ -

Order of Engineers of Quebec. Currently, he is Assistant Professor in Computer science at the LAMIH UMR CNRS 8201 research lab of the Université Polytechique Hauts-de-France (France) and INSA Hauts-de-France. With 18 years of experience in university teaching and training (~ 5000 h in Logistics, Industrial Engineering, Operational Research, Optimization, Computer Science and Mathematics), also professional experiences in the fields of Industrial Engineering, Logistics and Supply Chain. He has developed key experiences in optimization (metaheuristics, combinatorial optimization, exact methods (PL, PLNE ...), simulation, data mining, statistical analysis, logistics, supply chain, operations management and information systems design. He is, also, active in scientific research with many publications, reports and conferences.

Dr. Krimi Issam is an Assistant Professor of Supply Chain Analytics. He obtained Ph.D. from Polytechnic University of Hauts de France, France. He served as R&D analyst in collaboration with MIT before joining OCP Group as a Program Lead for Supply Chain Innovation. Dr. Krimi teaches Project Management, Information Technology Management, and Business Analytics. His research interests focus on developing efficient mathematical models and algorithms for production scheduling, maintenance planning and port-related operations planning. He attended several conferences and published articles, appeared in journals, such as Journal of Global Optimization, RAIRO and others.

Ziyad Bahou holds a MS degree in industrial engineering, from LORRAINE University in Metz, France. He is actually a PhD student at Department of industrial engineering with Research Team in modeling and decisions support for systems at Ecole Mohammadia d'Ingénieurs (EMI), Mohamed V University, Morocco. He is interested in operations research. His work is focused, more specifically, on fleet management and vehicle scheduling problem.