



**Le programme de doctorat en génie mécanique de la
Faculté des sciences et de génie présente la soutenance de
thèse de**

Mohamed-Larbi Rebaiaia

«A Contribution to the evaluation and optimization of networks reliability»

Membres du jury : Prof. Daoud Aït-Kadi, directeur de recherche (Université Laval), **Prof. Zineb Simeu Abazi, examinateur externe** (Université de Grenoble, France), **Prof. Mustapha Nourelfath** (Université Laval), **Prof. Claver Diallo** (Dalhousie University), **Prof. Anouar Jamali** (ESITH, Maroc)

Présidente de séance : Prof. Sophie D'Amours, Vice-Doyenne (FSG, Université Laval)

Résumé :

This thesis treats the case of networks reliability evaluation and optimization. Several issues were discussed including the development of a methodology for modeling networks and evaluating their reliabilities. This methodology was validated as part of a radio communication network project. In this work, some algorithms have been developed to generate minimal paths and cuts for a given network. The generation of paths and cuts is an important contribution in the process of networks reliability and optimization. These algorithms have been subsequently used to assess reliability by a method based on binary decision diagrams. Several theoretical contributions have been proposed and helped to establish an exact solution of the stochastic networks reliability in which edges and nodes are subject to failure using factoring decomposition theorem. From this research activity, several tools have been implemented and results clearly show a significant gain in time execution and memory space used by comparison to many other implementations.

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