



**Centro de Investigação em Matemática e
Aplicações
Departamento de Matemática**

Seminário

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An Analytical Framework to Infer Multihop Path Reliability in Mobile Ad Hoc Networks

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Resumo

Mobile ad hoc networks are characterized by having nodes that are self-organized and cooperative without any kind of infrastructure. The mobility and multihop capability of these networks turns the network topology to change rapidly and unpredictably, being necessary to develop appropriate models to describe the dynamic of multihop paths. Due to complexity and intractability reasons, most of the analytical studies on the reliability of communication paths in mobile ad hoc networks are based on the assumption of link independence. In this work, an analytical framework is developed to characterize the random behavior of a multihop path and derive path metrics to characterize the reliability of paths. This is achieved through the modeling of a multihop path as a PDMP (piecewise deterministic Markov process). Two path based metrics are obtained as expectations of functionals of the process: the mean path duration and the path persistence. We show that these metrics are the unique solution of a set of integro-differential equations and provide a recursive scheme for their computation. Finally, numerical results illustrate the computation of the metrics; these results are compared with independent link approximation results.