

# Design and evaluation of admission control policies in mobile cellular networks

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## Abstract

In the last decade, mobile cellular networks have experienced a major growth and progress due to a change in the way today's society creates, shares and consumes information. The enormous impact and penetration of mobile phone services on the society, as well as the introduction of a large variety of multimedia and data services, has led to a spectacular growth of the traffic volume carried by these type of networks. This trend will continue in the coming years as new applications are continuously appearing with higher QoS and bandwidth requirements. However, current mobile cellular networks have to face strong bandwidth limitations due to the scarcity of frequencies in the radio spectrum. Thus, these new requirements have established new challenges for the telecommunication industry. It is necessary to manage an increasing number of demanding services together with the scarcity of the spectrum in order to offer services that meet the user needs in an efficient and economical manner. In this context, the radio resource management arises as a key strategy to deal with those network requirements. Specifically, the admission control is a key mechanism to efficiently use the available radio resources, while providing the required QoS guarantees for all users.

This work aims at designing and evaluating admission control policies implemented in mobile cellular networks that support different bearer services. Moreover, this thesis is a contribution to the development of models that evaluate different admission control policies in the challenging context introduced by the forthcoming 4G networks. Thus, in this thesis, the design and evaluation of admission control policies is tackled for current and forthcoming cellular networks. In the first part of the thesis, the development of admission control policies for current mobile cellular networks is studied, while in the second part of the thesis, novel admission control policies are proposed to overcome the challenges introduced by forthcoming mobile networks, such as Long Term Evolution networks or Cognitive Radio technologies.