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机器类通信流量建模与过载控制

Traffic modeling for machine type communication and its overload control

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英文关键词: [Internet of thing](#) [ubiquitous network](#) [machine-to-machine communication](#) [machine type communication](#) [Beta distribution](#) [traffic modeling](#) [overload control](#)

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中文摘要:

机器类通信(或MTC通信)定义为通过蜂窝网络进行数据传输的机器通信,作为未来泛在网络的重要组成部分,具有广阔的应用前景和市场潜力。为评估MTC接入时的网络性能,以3GPP参考流量模型和G/M/1队列模型的通解为基础,为MTC通信建立Beta/M/1队列模型;通过推导形状参数为任意正整数的Beta分布的概率生成函数的解析解,给出Beta/M/1模型性能评估的求解过程;利用数值分析,给出Beta/M/1模型的主要特征。为解决MTC接入时系统面临的过载问题,提出了3个解决办法,分别是:1)不同属性终端间聚类;2)改变MTC终端到达时间间隔分布;3)分段均匀随机退避算法。所提Beta/M/1模型及分段均匀随机退避算法可作为物联网/MTC通信/海量终端入网性能分析及过载控制的参考模型。

英文摘要:

Machine type communications (MTC), defined as machine to machine communication over cellular mobile network, is an integral part of future ubiquitous network and has broad application prospects and market potentials. To carry out the performance analysis of network in context of MTC applications, a Beta/M/1 queue model was proposed for modeling the network with MTC applications and its full performance analysis were given out by deducing the analytical expression of Beta distribution's moment generation function, in which the shape parameters of Beta distribution are assumed to be integer. In addition, to handle the congestion caused by mass concurrent data and signaling transmission from many MTC devices, three overload control measures were also presented, that is: 1) inter-class grouping techniques; 2) reshaping the inter-arrival time distribution of MTC devices; 3) segment-wise uniform back-off scheme. The Beta/M/1 model and segment-wise uniform back-off scheme proposed here can be used as a preliminary model for different MTC application scenarios and serve as a fundamental traffic model and overload control method for future ubiquitous network.

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