PREFACE

Over the past few decades, coverage and connectivity of wireless sensor ad hoc networks have attracted considerable attention. One of the most fundamental issues in a Wireless Sensor Network is, *Connectivity Problem*, which directly affects its capability and efficiency. A metric called *Node Isolation Probability* is defined here, to express connectivity and coverage characteristics of a random ad-hoc network. This is the probability where a randomly chosen node is not connected to any other node within the network. Since the emergence of wireless communication network and especially ad hoc network, because of its robustness and dynamic nature, a number of researches have been conducted and systems have been proposed. By employing k-connectivity approach in WSNs, a higher quality of service of network has been ensured and a noble approach with random graph model or “cryptography approach ” was derived that ultimately estimates the asymptotic probability that a node in WSN is connected by means of k-connectivity in a secured way.

Chapter 1 introduces wireless ad hoc and sensor network connectivity analysis in ad hoc network and node isolation probability. Chapter 2 covers the literature survey related to the previous research works carried for node isolation probability evaluation in ad hoc network. Chapter 3 deals with the basic background of the research work and techniques being implemented in wireless ad hoc network. Chapter 4 mainly discusses the previous or supporting research work.
for accomplishing the same goal with different techniques. In this section the researches like, node isolation probability estimation using Border effects and Selection combing with *Threshold-Hybrid Selection/Maximum Ratio* combining have been done. Chapter 5 is completely dedicated to the specific goal oriented research conducted by author. This chapter also covers research conducted on node isolation probability estimation or evaluation using k-connectivity probability approach and also discusses the mathematical equations derivation and their signifying characteristics presentations. Chapter 6 mainly discusses about the technical aspects of research implementation and its resulting outputs. The results obtained after simulating the simulation framework with different fading channels and circumstances.

Chapter 7 concludes with future scope of the work done in this thesis. My hearty thanks to my guide Dr. D. Satya Narayana and Dr. M.N. Giri Prasad for their untiring efforts and kind guidance throughout my Ph.D Course for getting this thesis in a useful manner and as per the latest standards.