# Topological Properties of Secure Wireless Sensor Networks Under the q-Composite Key Predistribution Scheme With Unreliable Links

## ABSTRACT

Wireless sensor networks (WSNs) enable a broad range of applications including military surveillance home automation, and patient monitoring. In many scenarios, since WSNs are deployed in adversarial environments, security becomes an important issue. To this end, key predistribution has been recognized as a typical solution to secure WSNs. The idea is to randomly assign cryptographic keys to sensors before network deployment.

## EXISTING SYSTEM

In Existing System, Security is an important issue in wireless sensor networks (WSNs), which are often deployed in hostile environments. The *q*-composite key predistribution scheme has been recognized as a suitable approach to secure WSNs. Although the *q*-composite scheme has received much attention in the literature, there is still a lack of rigorous analysis for secure WSNs operating under the *q*-composite scheme in consideration of the unreliability of links. One main difficulty lies in analyzing the network topology, whose links are not independent. Wireless links can be unreliable in practice due to the presence of physical barriers between sensors or because of harsh environmental conditions severely impairing communications.

## DIS ADVANTAGES

- Communication links between sensor nodes may not be available due to the presence of physical barriers between nodes or because of harsh environmental conditions severely impairing transmission.
- Security is an important issue in wireless sensor networks (WSNs).

## PROPOSED SYSTEM

In Proposed System, we resolve the difficult challenge and investigate topological properties related to node degree in WSNs operating under the $q$-composite scheme with unreliable communication links modeled as independent ON/OFF channels. Specifically, we derive the asymptotically exact probability for the property of minimum degree being at least $k$, present the asymptotic probability distribution for the minimum degree, and demonstrate that the number of nodes with a fixed degree is in distribution asymptotically equivalent to a Poisson random variable. We further use the theoretical results to provide useful design guidelines for secure WSNs. Experimental results also confirm the validity of our analytical findings.

## ADVANTAGES

- It provides useful design guidelines for secure WSNs.
- It provides a guarantee of network reliability against the failure of $(k - 1)$ sensors due to adversarial attacks, battery depletion, harsh environmental conditions, etc.

## SYSTEM REQUIREMENTS

**H/W System Configuration:-**

| | | |
|---|---|---|
| Processor | - | Pentium –III |
| RAM | - | 256 MB (min) |
| Hard Disk | - | 20 GB |
| Key Board | - | Standard Windows Keyboard |
| Mouse | - | Two or Three Button Mouse |
| Monitor | - | SVGA |

**S/W System Configuration:-**

| | | |
|---|---|---|
| Operating System | : | Windows95/98/2000/XP |
| Application Server | : | Tomcat5.0/6.X |

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|---|---|---|
| Front End | : | HTML, Jsp |
| Scripts | : | JavaScript. |
| Server side Script | : | Java Server Pages. |
| Database | : | MySQL 5.0 |
| Database Connectivity | : | JDBC |