



Department of Applied Mathematics, Delhi Technological University, Delhi 110042

RESEARCH LAB (RL2)

The “Information security and Cryptography” is one of the research areas identified in the Department of Applied Mathematics (DTU). The information theory is mainly divided into two categories: (i) Classical information theory, and (ii) Quantum information theory. Classical information theory is the mathematical theory which deals with the transmission, storage and manipulation of information. The fundamental unit of information measure in classical information theory is the bit. On the other hand, quantum information theory is the study of how information can be transmitted using quantum mechanical system and how it can be stored for a long time. The fundamental unit of quantum information theory is the qubit i.e. quantum bit. Also, it can be observed that a bit in which a classical information has been encode can be cloned but the perfect cloning of a qubit has been forbidden in the quantum information theory. Contrary to the above fact, there exists a concept of entanglement in quantum information theory but there does not exist any classical analog of it. Thus it is very important to gain knowledge not only about the limitations of both types of information theory but also it is crucial to secure information encrypted in the message, when the message is transmitting from one place to another place. At present, the purpose of this laboratory is to develop theoretical framework that may lead to the progress of the security aspect of the information theory.

Broad Topics of Research:

- Generalized Quantum Information Measures and Applications
- Android Malware Detection
- Quantum Information Theory
- Optimization
- Algebraic Aspects of Cryptography

Objectives:

- To study trigonometric entropies and different divergence measures as a measure of classical information both from quantitative and qualitative concepts.
- To understand the resource theory of entanglement under quantum information theory.
- To develop the quantum key distribution protocol and analyze its security.
- To study convex optimization problem in quantum information theory.
- To develop methods that can detect android malware.

Group Members:

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