Cryptography for Unconditionally Secure Message Transmission in Networks (Invited Talk)

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We consider the model of unconditionally secure (r -round, n -channel) message transmission schemes which was introduced by Dolev et al. [1]. In this model, there are n channels between a sender and a receiver, and an infinitely powerful adversary $\mathbf{A}$ may corrupt (observe and forge) the messages sent through t out of n channels. The sender wishes to send a secret s to the receiver in r -round without sharing any key with the receiver.

We say that a message transmission scheme is perfectly secure if it satisfies perfect privacy and perfect reliability. The perfect privacy means that the adversary $\mathbf{A}$ learns no information on s , and the perfect reliability means that the receiver can output s correctly. We say that it is *almost* secure if it satisfies perfect privacy and *almost* reliability.

In this talk, we survey some protocols and bounds for the above problem. We also describe some new results for general adversary structures [4,5]. In particular, we introduce the general error decodable secret sharing scheme and show its application to 1-round perfectly secure message transmission schemes [4].

References

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