

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**MATHEMATICAL MODELLING ON COMMUNICATION BETWEEN
TWO PARTIES
(P24M22)**

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ABSTRACT

Elliptic Curve Cryptography (ECC) is a key-based technique for encrypting data. A key pair where the private and public keys is often used by an individual in public key cryptography communication procedures to operate the cryptographic system. A shared key is used to implement communication between two parties using an elliptic curve with the prime p and q . The prime number p is chosen to have a finitely large number of points on the elliptic curve to make the cryptosystem more secure. The current research was carried out to determine the mathematical modelling on one-way communication between two parties using the Kuwakado scheme (2018) method with the proposed system of key exchange on ECC using the operation in generating a point. This descriptive-analytical study was resolved using the formulation of the study such as point addition, point doubling, and double-and-add algorithm. The Kuwakado scheme (2018) has been summarized in key generation, encryption, and decryption algorithms. In this study, point $m = (2,4)$ is chosen since it exists on the elliptic curve and will be calculated until $11G$ using the double-and-add algorithm. To test the proposed system of key exchange, the suitable points are important for the receiver including the same and different values of points x on the elliptic curve. The proposed method of two-party one-way communication and the ECC key exchange protocol may be extended in future research to explore experimental numerical examples of element selection. The algorithm can be developed by using MAPLE software to generate points and calculate the procedure more easily. Since the key exchange process is successful, we think the offered methods are effective.