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A COMPREHENSIVE REVIEW OF ASYMMETRIC IMAGE ENCRYPTION TECHNIQUES

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ABSTRACT

Asymmetric image encryption techniques have emerged as crucial methodologies for ensuring the security and integrity of digital images in various applications, ranging from medical imaging to secure communication. This paper provides a comprehensive review of the state-of-the-art asymmetric image encryption techniques, highlighting their underlying principles, algorithmic strategies, and performance metrics. By leveraging public and private key pairs, these techniques offer enhanced security features compared to traditional symmetric encryption methods. The analysis covers key algorithms such as RSA, ECC (Elliptic Curve Cryptography), and their hybrid implementations with other cryptographic protocols. Experimental results demonstrate the robustness and efficiency of these methods in terms of encryption speed, computational complexity, and resistance to common cryptographic attacks. Furthermore, the paper discusses potential applications, current challenges, and future directions for research in asymmetric image encryption, aiming to provide a foundational understanding for researchers and practitioners in the field of digital image security.