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## **Quantum Block Encoding of Semiseparable Matrices**

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Quantum block encoding (QBE) is a crucial step in the development of many quantum algorithms, as it embeds a given matrix into a suitable larger unitary matrix. Historically, efficient techniques for QBE have primarily focused on sparse matrices, with less attention given to data-sparse matrices, such as rank-structured matrices. In this work, we examine a specific case of rank structure: one-pair semiseparable matrices. We present a novel block encoding approach that utilizes a suitable factorization of the given matrix into the product of triangular and diagonal factors. Our algorithm requires O(polylog(N)) qubits and allows us to compute matrix-vector products in O(polylog(N)) quantum operations, where N is the size of the matrix.

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