Characterization of Nearly Self-Orthogonal Quasi-Twisted Codes and Related Quantum Codes

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Quasi-twisted codes are used here as the classical ingredients in the so-called Construction X for quantum error-control codes. The construction utilizes nearly self-orthogonal codes to design quantum stabilizer codes. We expand the choices of the inner product to also cover the symplectic and trace-symplectic inner products, in addition to the original Hermitian one. A refined lower bound on the minimum distance of the resulting quantum codes is established and illustrated. We report numerous record breaking quantum codes from our randomized search for inclusion in the updated online database.