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Bounds on negativity for the success of quantum teleportation of qutrit-qubit system PAULSON K G, S.V.M SATYANARAYANA, Pondicherry University — In the original protocol Bennet et.al., used maximally entangled pure states as quantum channel to teleport unknown states between distant observers with maximum fidelity. Noisy quantum channel can be used for imperfect teleportation. Both degree of entanglement and mixedness decide the success of teleportation in the case of mixed entangled quantum channel. . In one of our previous works, we discussed the existence of lower bound below which ,state is useless for quantum teleportation in the measure of entanglement for a fixed value of fidelity, and this lower bound decreases as rank increases for two-qubit system. We use negativity as the measure of entanglement. . In this work, we consider a qutrit-qubit system as quantum channel for teleportation, and study how the negativity and rank affect the teleportation fidelity for a class of states. We construct a new class of mixed entangled qutrit-qubit states as quantum channel, which is a convex sum of orthonormal maximally entangled and separable pure states. The classical limit of fidelity below which state is useless for quantum teleportation is fixed as 2/3. We numerically generate 30000 states and estimate the value of negativity below which each rank mixed state is useless for quantum teleportation. We also construct rank dependant boundary states by choosing appropriate eigen values, which act as upper bound for respective rank states.

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