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## Entanglement and Frustration in Quantum Many-body Systems

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### Abstract:

We define a universal measure of frustration for quantum systems and provide sharp lower bounds in terms of a class of entanglement monotones. We identify a set of sufficient conditions for a spin-1/2 system to saturate these bounds and show how they represent a quantum generalization of the Toulouse criterion for frustration-free classical systems. Our analysis provides a unifying scheme for studying entanglement and frustration in quantum systems and shows how the relation among these is dictated by the presence or absence of geometric frustration.