

Notes on Quantum Complexity Theory

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Complexity Classes

1. **BQP** (Bounded Quantum Polynomial Time) is the complexity classes characterizing the languages which are decidable in quantum polynomial time. Formally speaking,

$L \in \mathbf{BQP}$ iff

$\exists \{Q_n\}_{n \in \mathbb{N}}$ a polynomial-time generated circuit family s.t

$$x \in L \text{ then } \mathbf{Pr}[Q_{|x|}(x) \text{ accepts } x] \geq \frac{2}{3}$$

$$x \notin L \text{ then } \mathbf{Pr}[Q_{|x|}(x) \text{ accepts } x] \leq \frac{1}{3}$$

2. $\mathbf{BPP} \subseteq \mathbf{BQP}$