LRE: Layerwise Rescaling Extrapolation

Quantum Error Mitigation Summary

May 1, 2025

Overview

LRE resamples circuits by scaling the number of noisy operations layerwise, allowing extrapolation using multivariate polynomial fitting.

Mathematics

Let C be a quantum circuit and A_i be observables for scaled versions of C. We fit:

$$A(\vec{\lambda}) \approx \sum_{\alpha} c_\alpha \lambda^\alpha \quad \Rightarrow \quad A_0 = \text{mitigated result}$$

Implementation

- Use `multivariate_layer_scaling()` to generate scaled circuits.
- Use `multivariate_richardson_coefficients()` to compute coefficients.