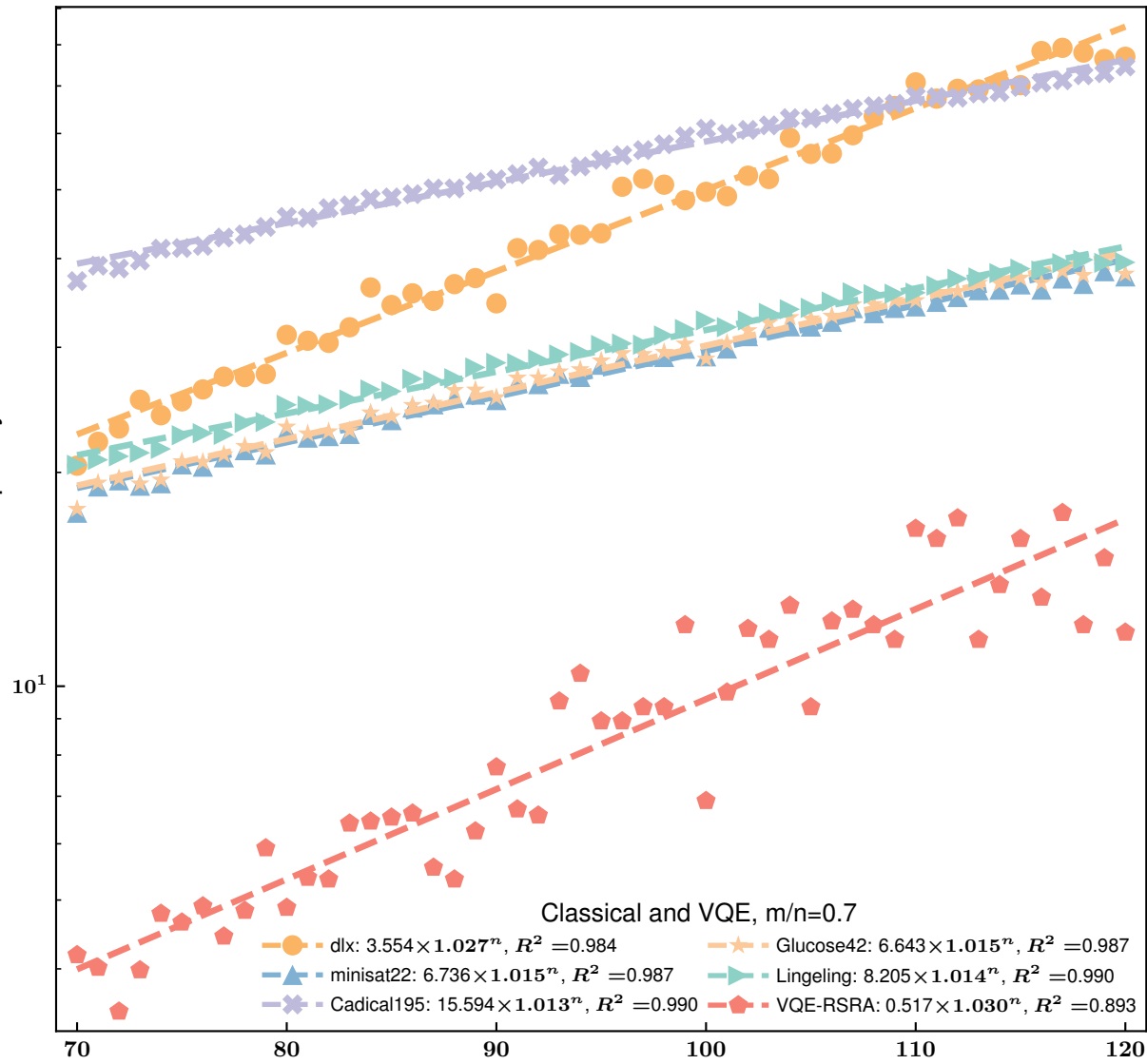


a

Time complexity



b

Time complexity

 n

100 layer QAA, $m/n=0.7$

Legend:

- QAA-RSRA: 0.771×1.010^n , $R^2 = 0.974$
- QAA: 0.927×1.046^n , $R^2 = 0.991$

The plot shows time complexity on a logarithmic scale (y-axis) versus problem size n on a linear scale (x-axis, ranging from 5 to 65). The QAA-RSRA method (dark blue circles) shows lower complexity than the standard QAA method (light blue triangles).

c

Time complexity

 n

25 layer QAOA, $m/n=0.7$

Legend:

- QAOA-RSRA: 0.832×1.010^n , $R^2 = 0.951$
- QAOA: 0.883×1.044^n , $R^2 = 0.961$

The plot shows time complexity on a logarithmic scale (y-axis) versus problem size n on a linear scale (x-axis, ranging from 10 to 40). The QAOA-RSRA method (dark blue circles) shows lower complexity than the standard QAOA method (light blue triangles).