

Comparative QKD Network Analysis

February 17, 2025

1 Network Characteristics Comparison

Table 1: Network Characteristics Across Different Node Counts

Metric	Number of Nodes				
	10	20	50	100	250
Number of Edges	39.000	123.000	718.000	2885.000	17402.000
Average Degree	7.800	12.300	28.720	57.700	139.216
Average Key Rate (bits/s)	648.496	1116.063	1036.530	2863.562	3980.181
Average QBER	0.054	0.062	0.061	0.059	0.060
Maximum Distance (km)	12.072	12.072	12.383	12.420	12.426
Edge Connectivity	5.000	2.000	9.000	21.000	52.000
Node Connectivity	5.000	2.000	8.000	15.000	41.000
Algebraic Connectivity	4.738	1.085	2.947	5.476	14.951

2 Link Prediction Performance Comparison

Table 2: Link Prediction Performance Metrics Across Different Node Counts

Metric	Number of Nodes				
	10	20	50	100	250
AUC (mean)	0.690	0.824	0.797	0.701	0.644
AUC (std)	0.073	0.035	0.023	0.071	0.047
AP (mean)	0.703	0.781	0.734	0.660	0.604
AP (std)	0.078	0.031	0.023	0.054	0.044