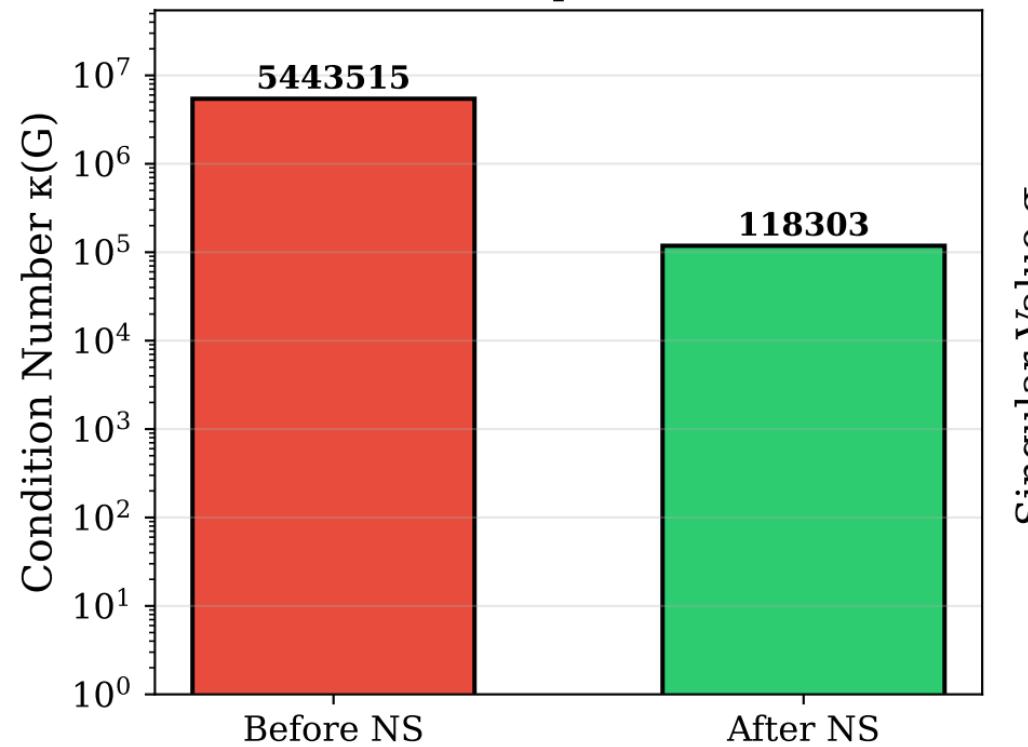
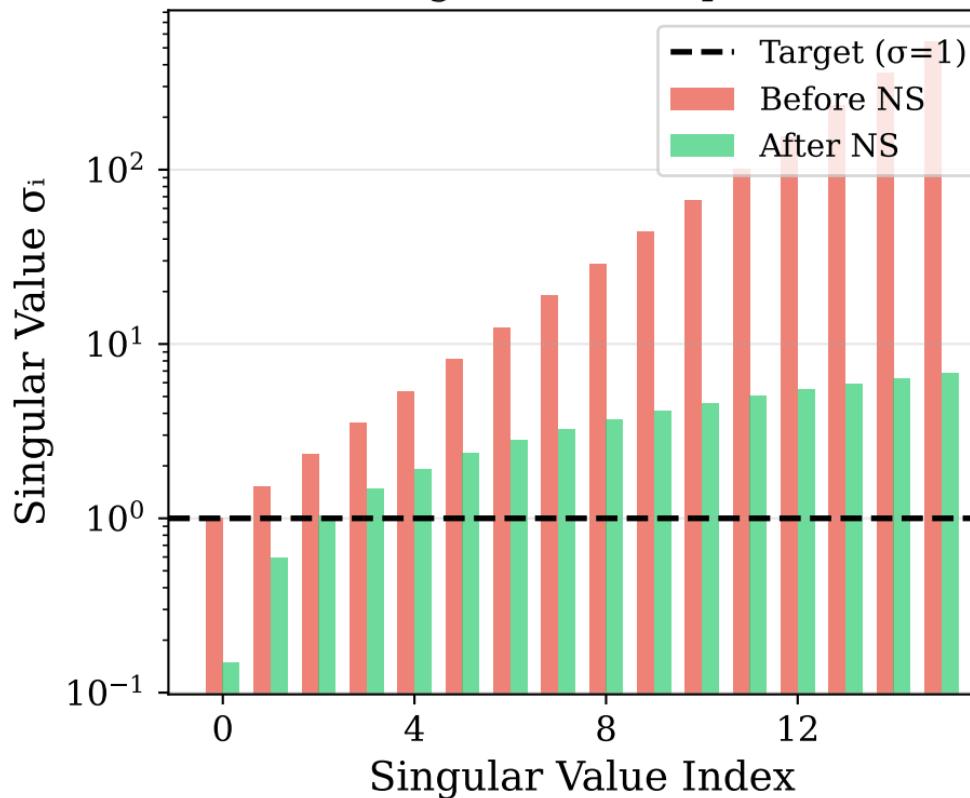


Newton-Schulz Orthogonalization Effect on HAR Training

(a) Condition Number Reduction
(46.0 \times improvement)



(b) Singular Value Spectrum



(c) Summary of NS Benefits

Metric	Before NS	After NS	Improvement
Condition Number κ	~5M	~118K	46 \times
Numerical Stability	Poor	Good	Green icon
Gradient Flow	Unstable	Stable	Green icon