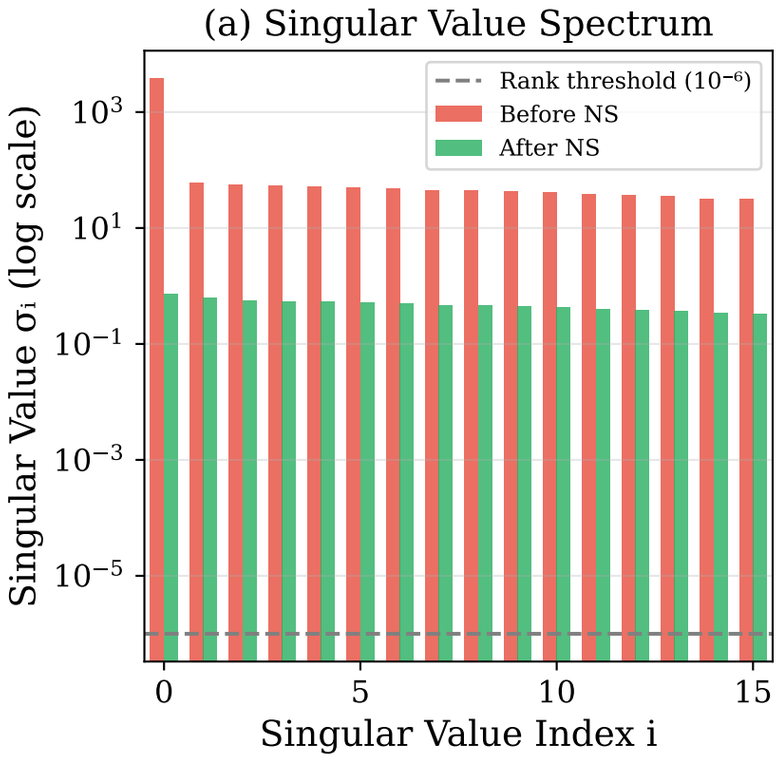
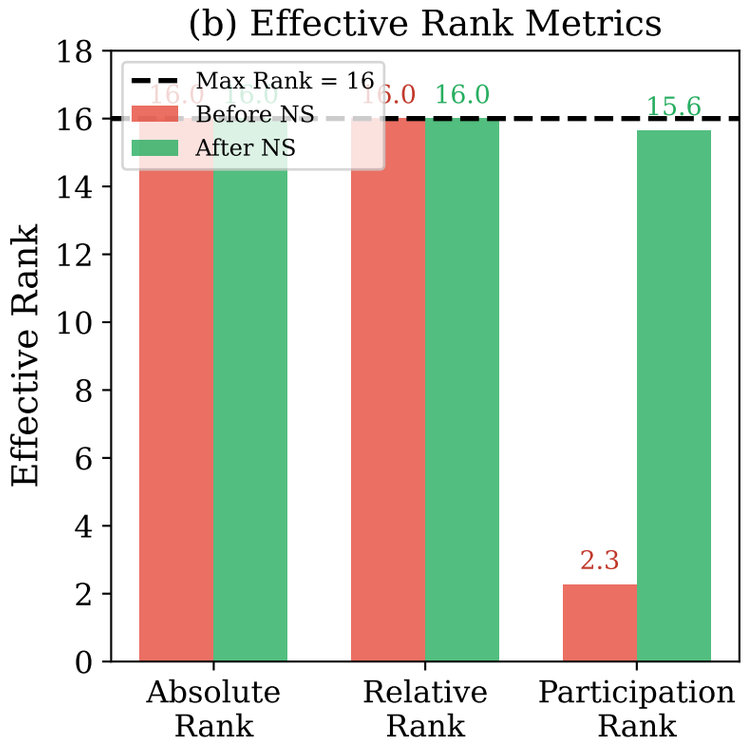
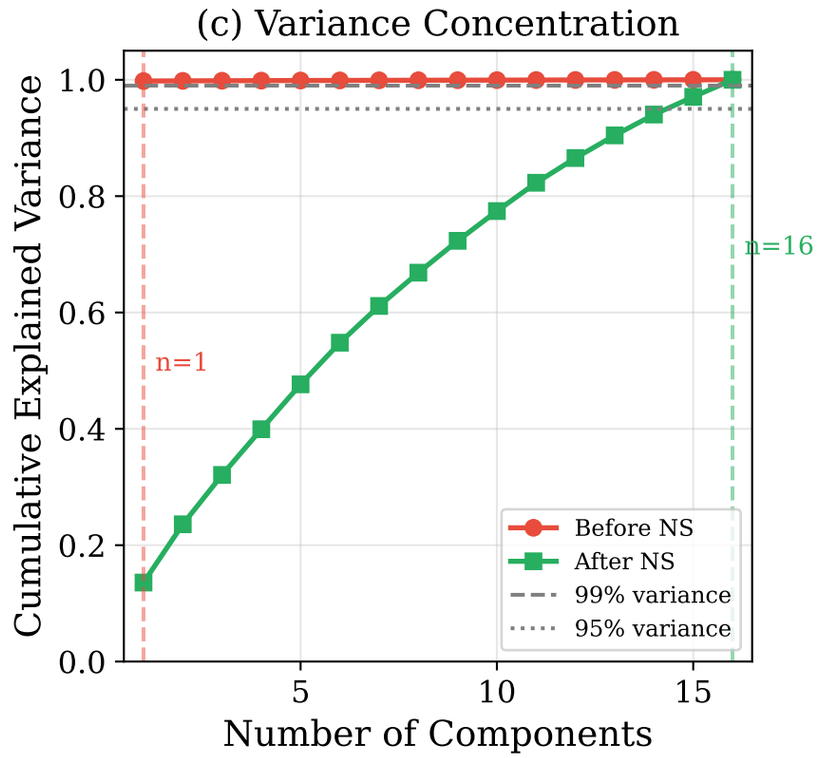
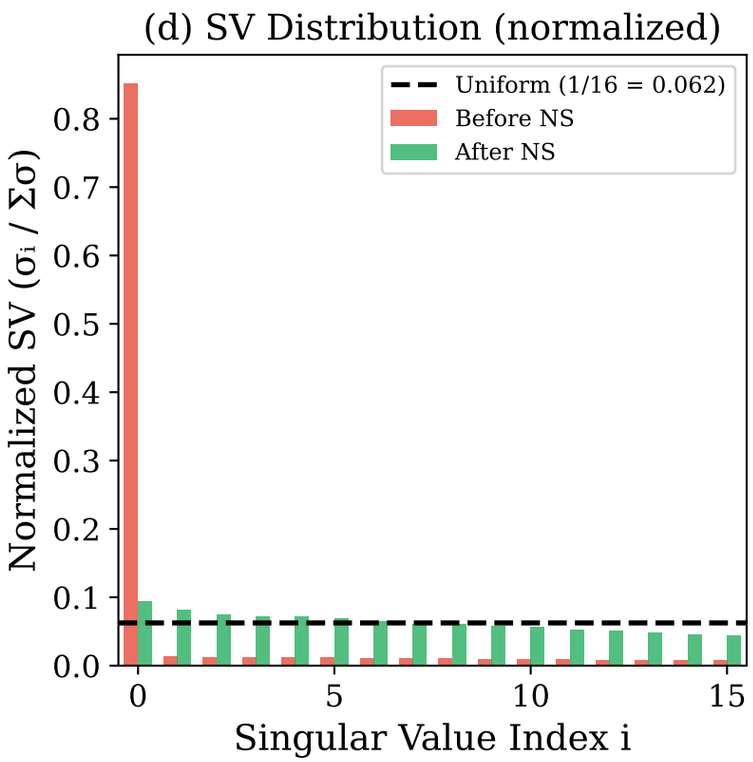
Newton-Schulz Transforms Near Rank-Deficient Matrix to Full-Rank









(e) Summary

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RANK ANALYSIS SUMMARY
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Matrix shape: [128 × 16]
Maximum possible rank: 16

BEFORE Newton-Schulz:
├─ Effective rank: 16 / 16
├─ Participation rank: 2.3
├─ Condition number: 1.20e+02
└─ Components for 99%: 1

AFTER Newton-Schulz:
├─ Effective rank: 16 / 16  ← FULL RANK!
├─ Participation rank: 15.6
├─ Condition number: 2.15e+00
└─ Components for 99%: 16

IMPROVEMENT:
├─ Rank: 16 → 16 (1.0×)
└─ Condition: 55.9× reduction
```