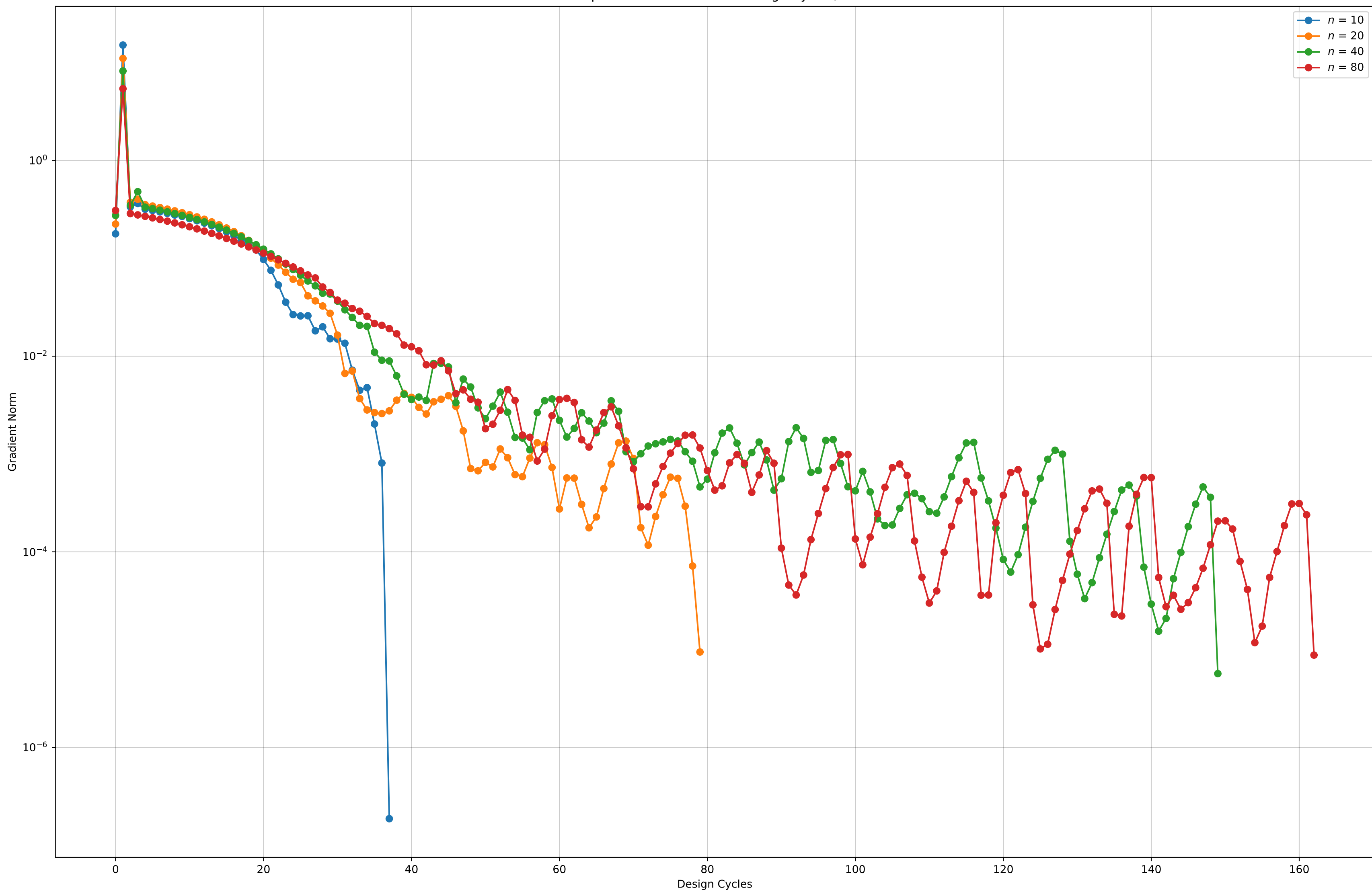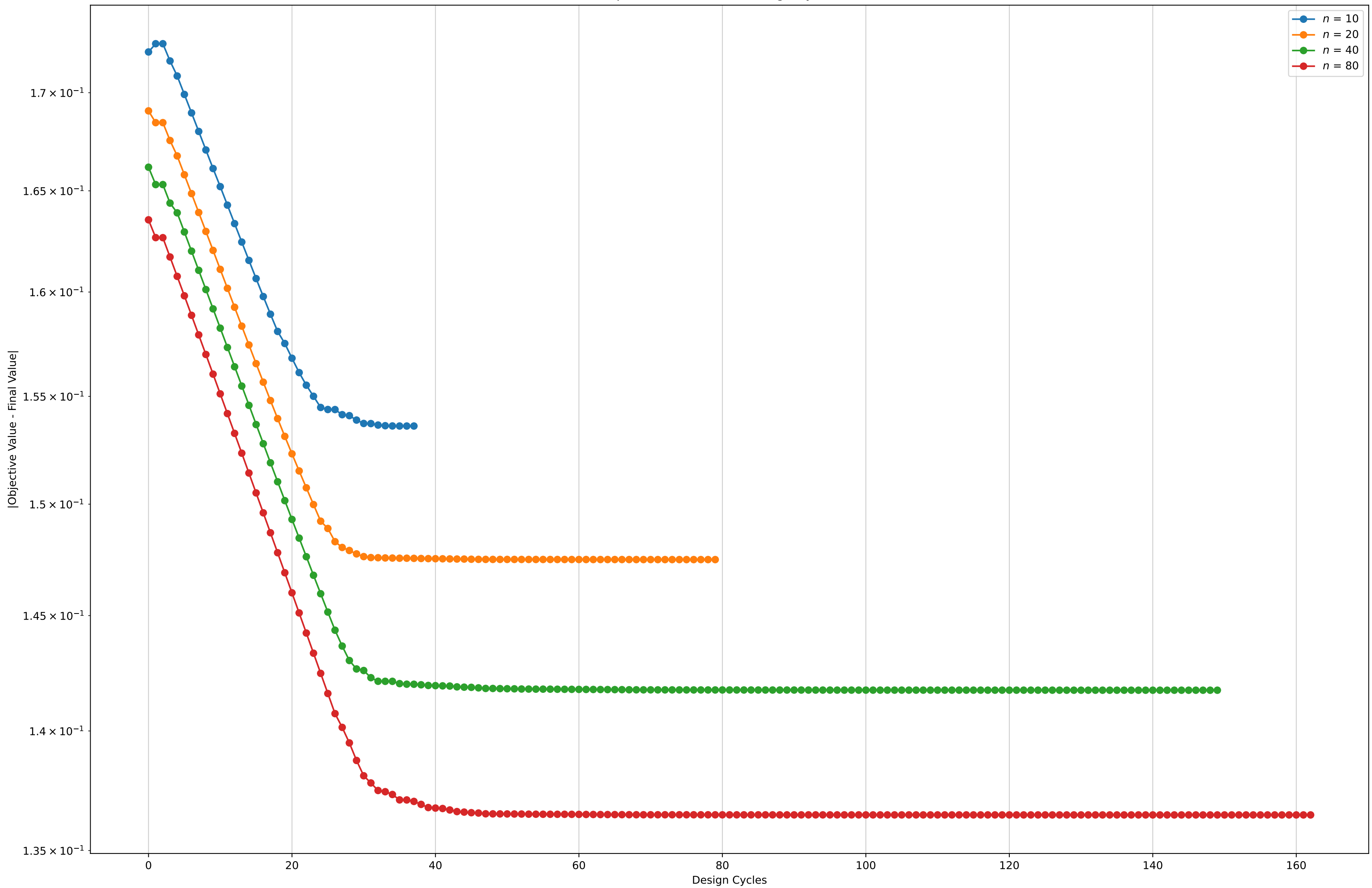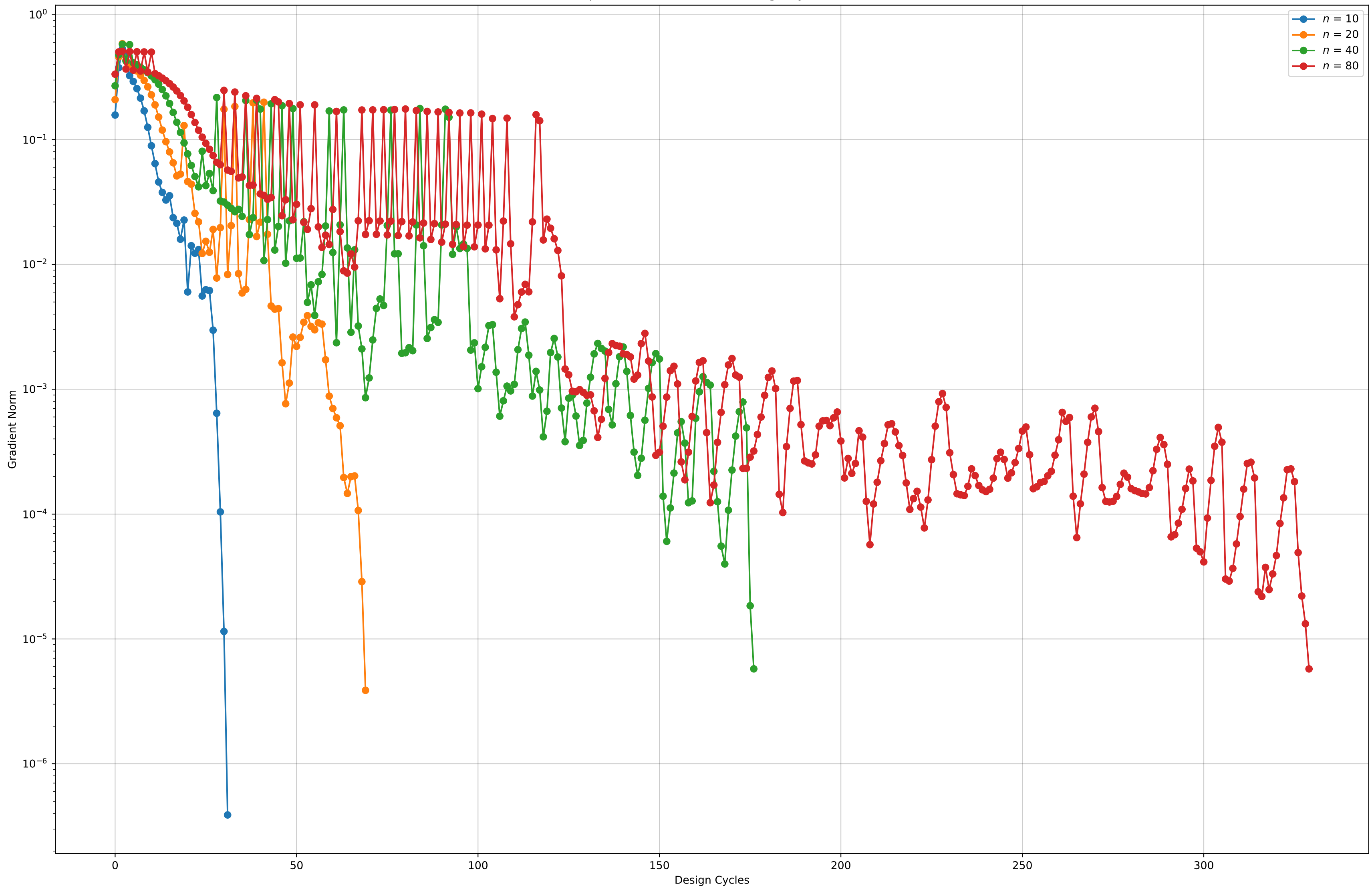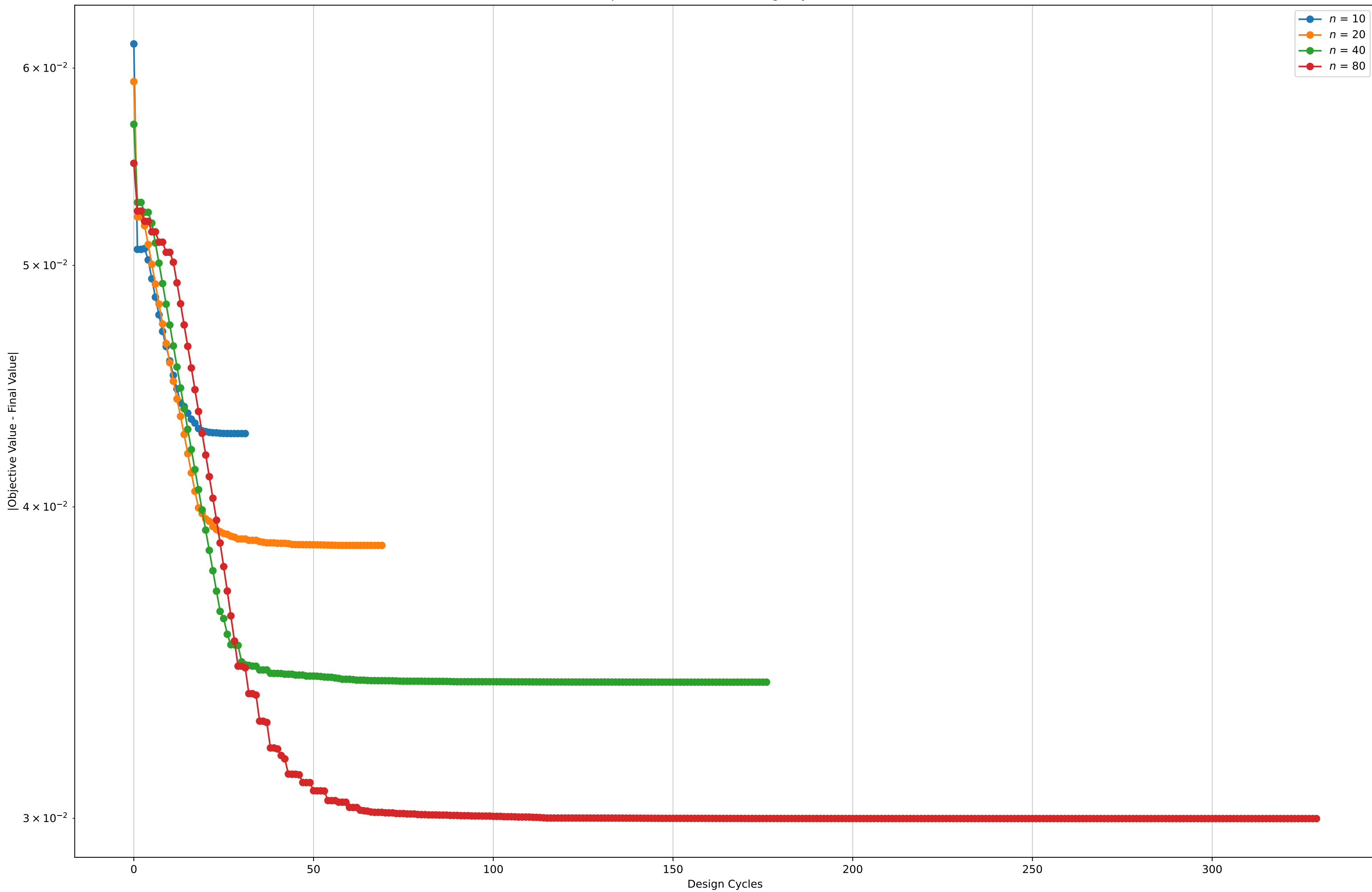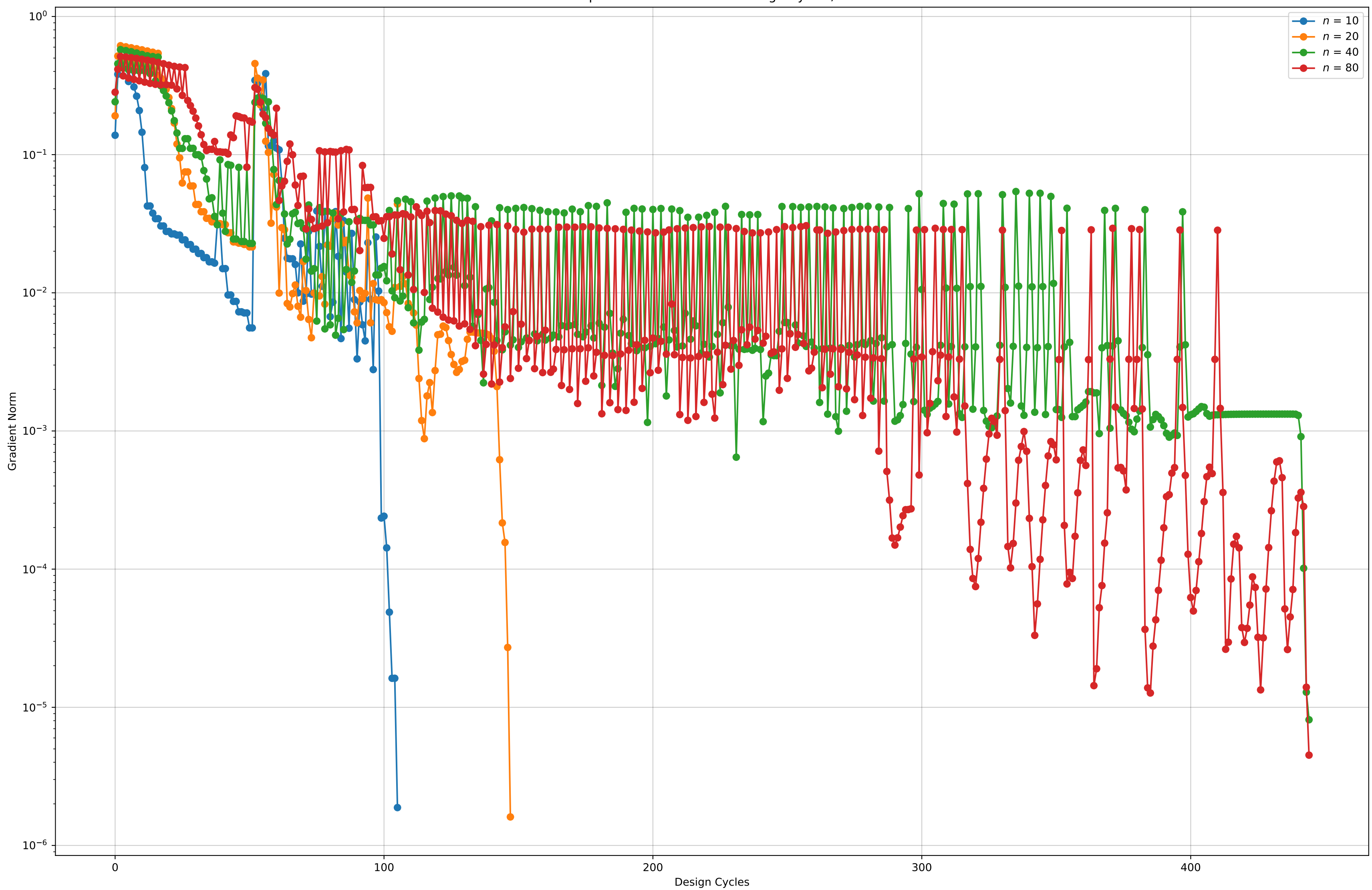Reduced-space BFGS Gradient vs Design Cycles, $m = 2594$

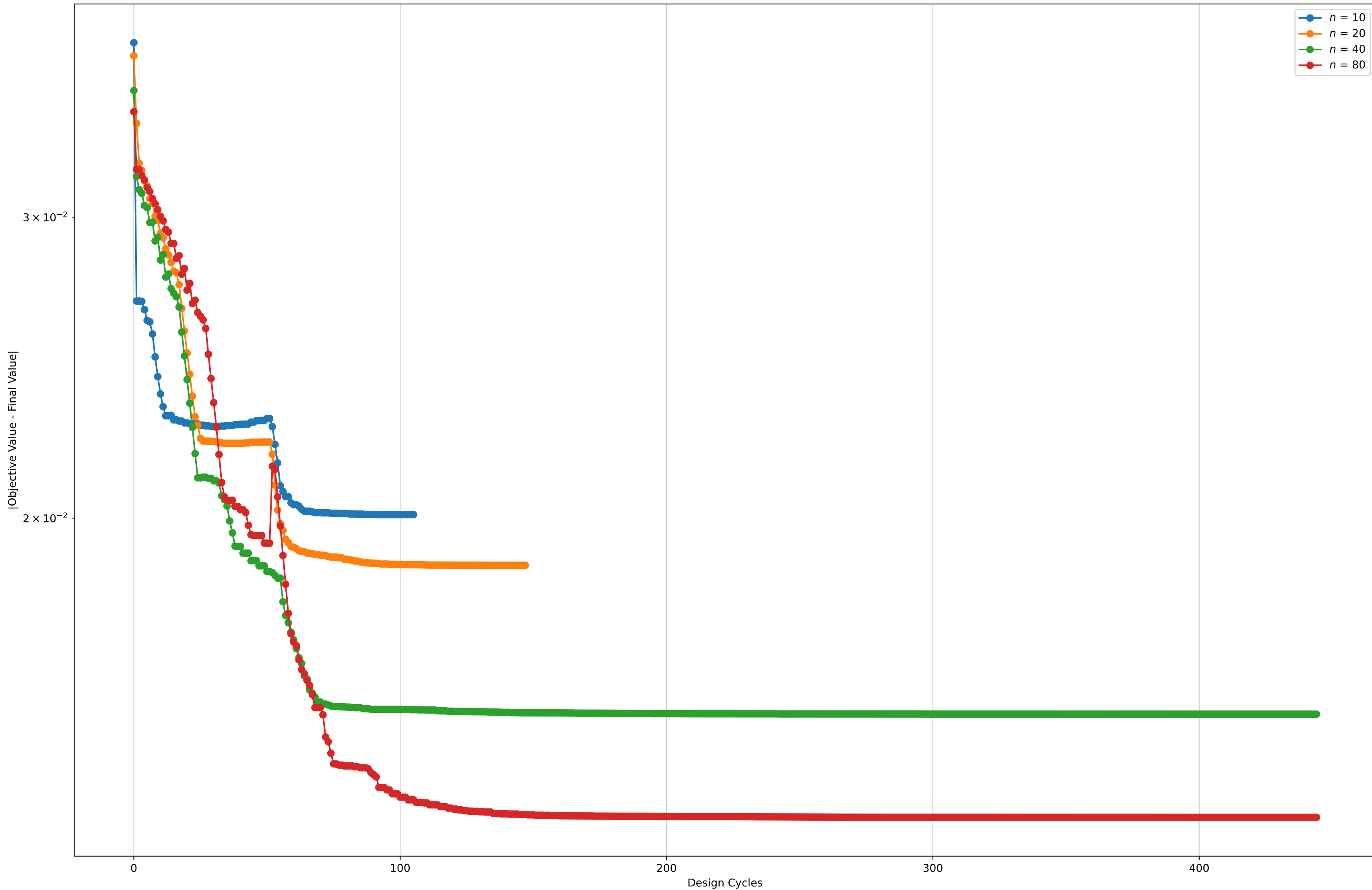Reduced-space BFGS Value vs Design Cycles, $m = 2594$

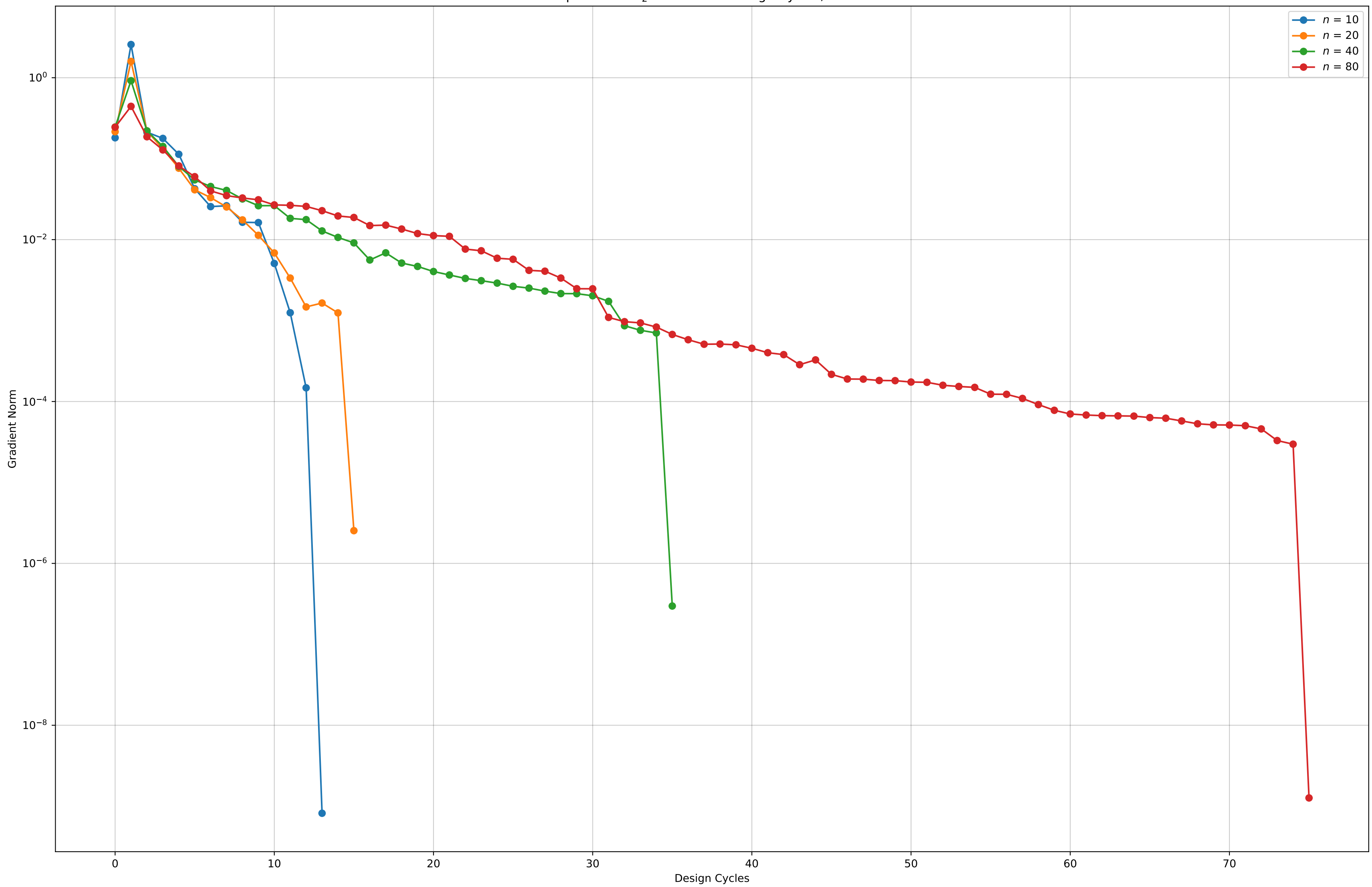Reduced-space BFGS Gradient vs Design Cycles, $m = 5186$

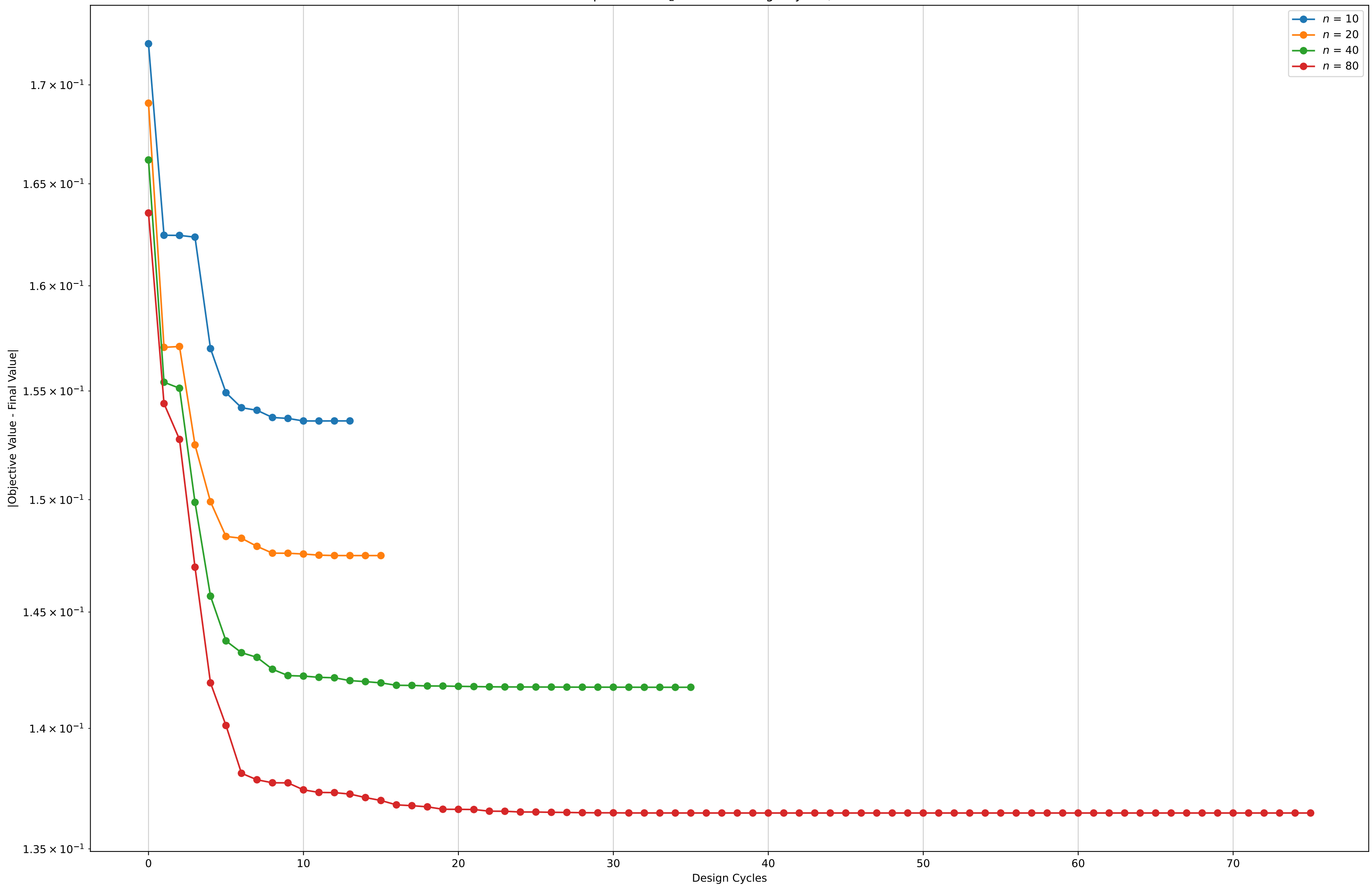Reduced-space BFGS Value vs Design Cycles, $m = 5186$

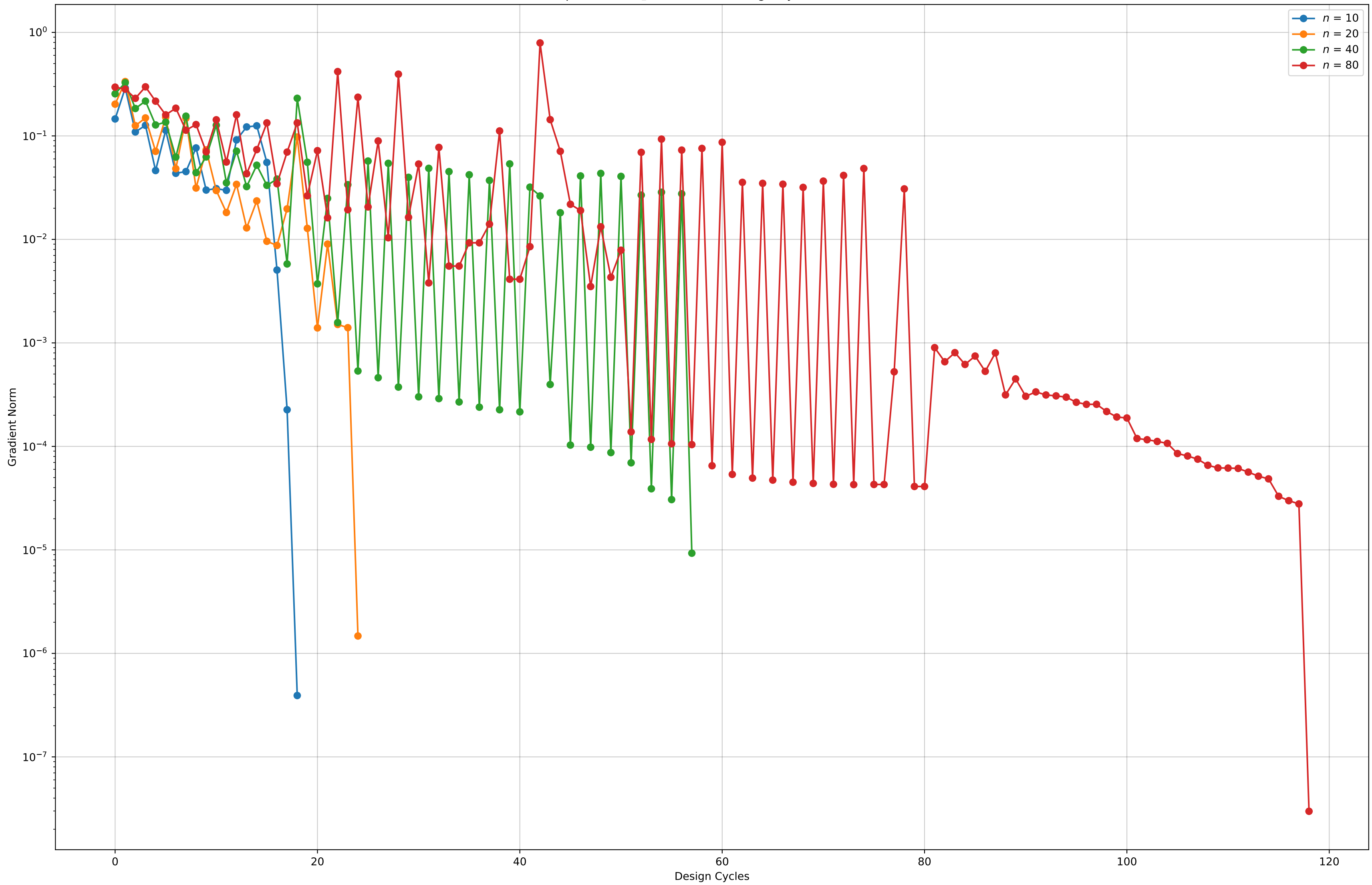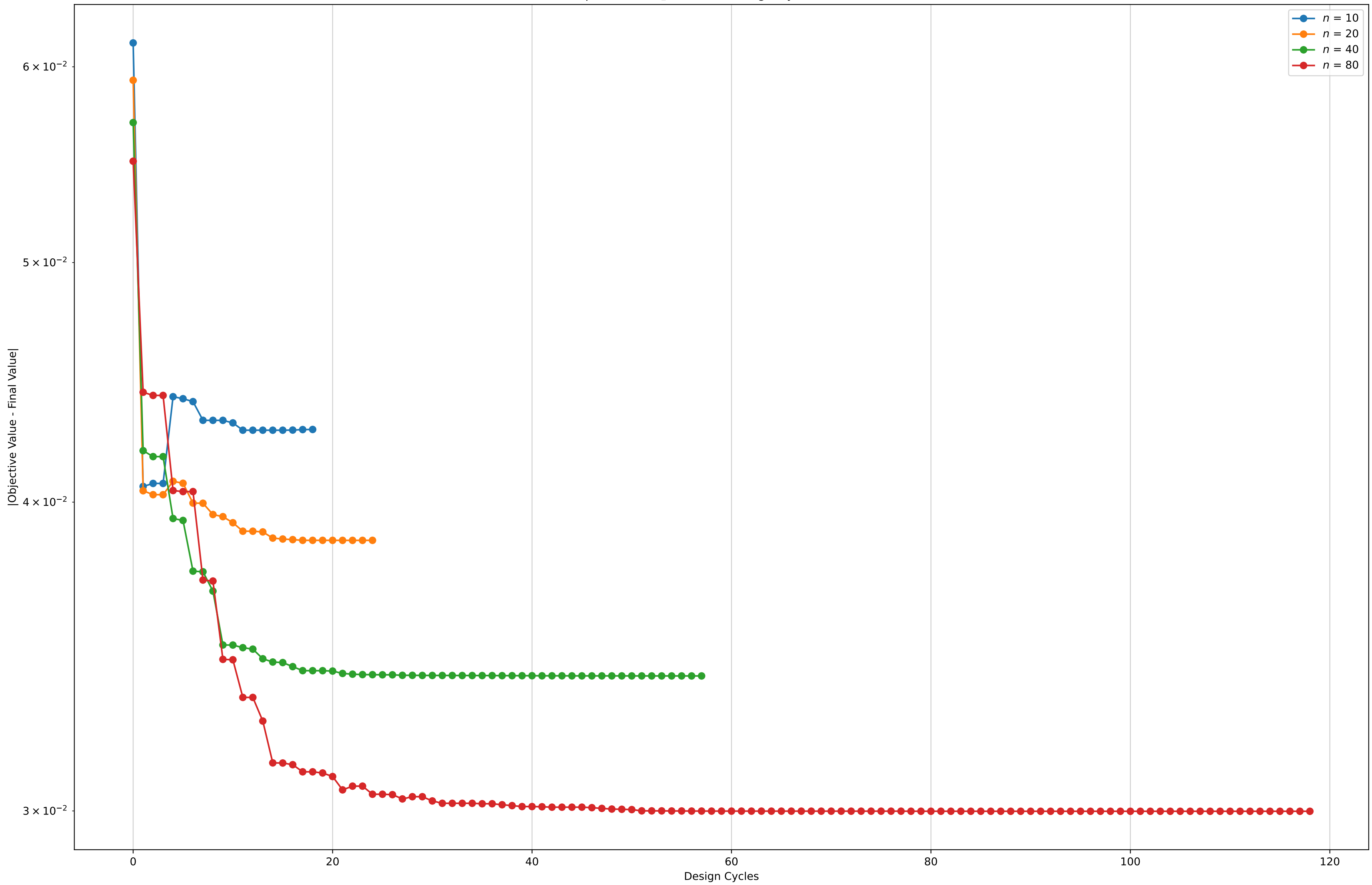Reduced-space BFGS Gradient vs Design Cycles, $m = 7778$

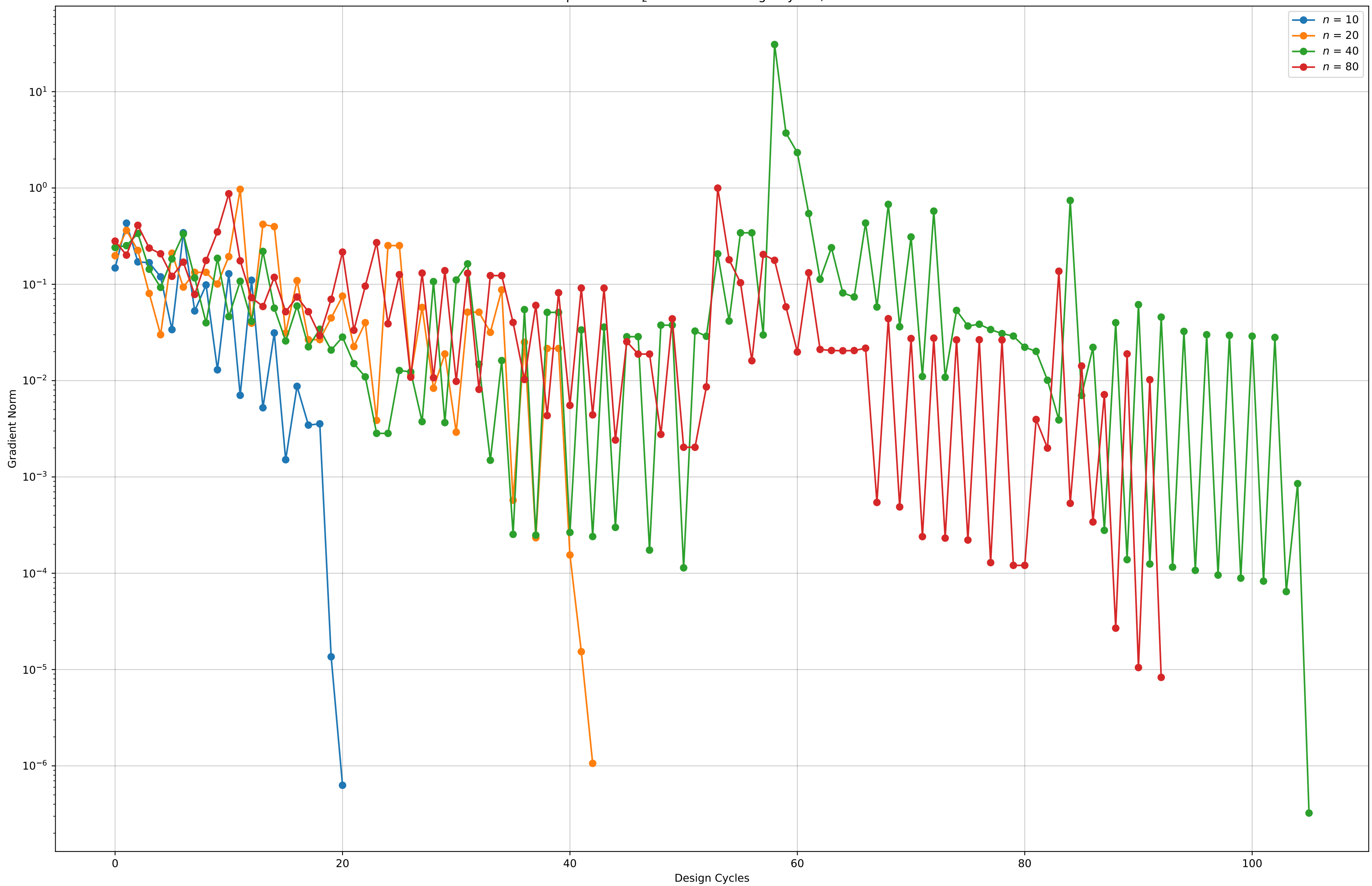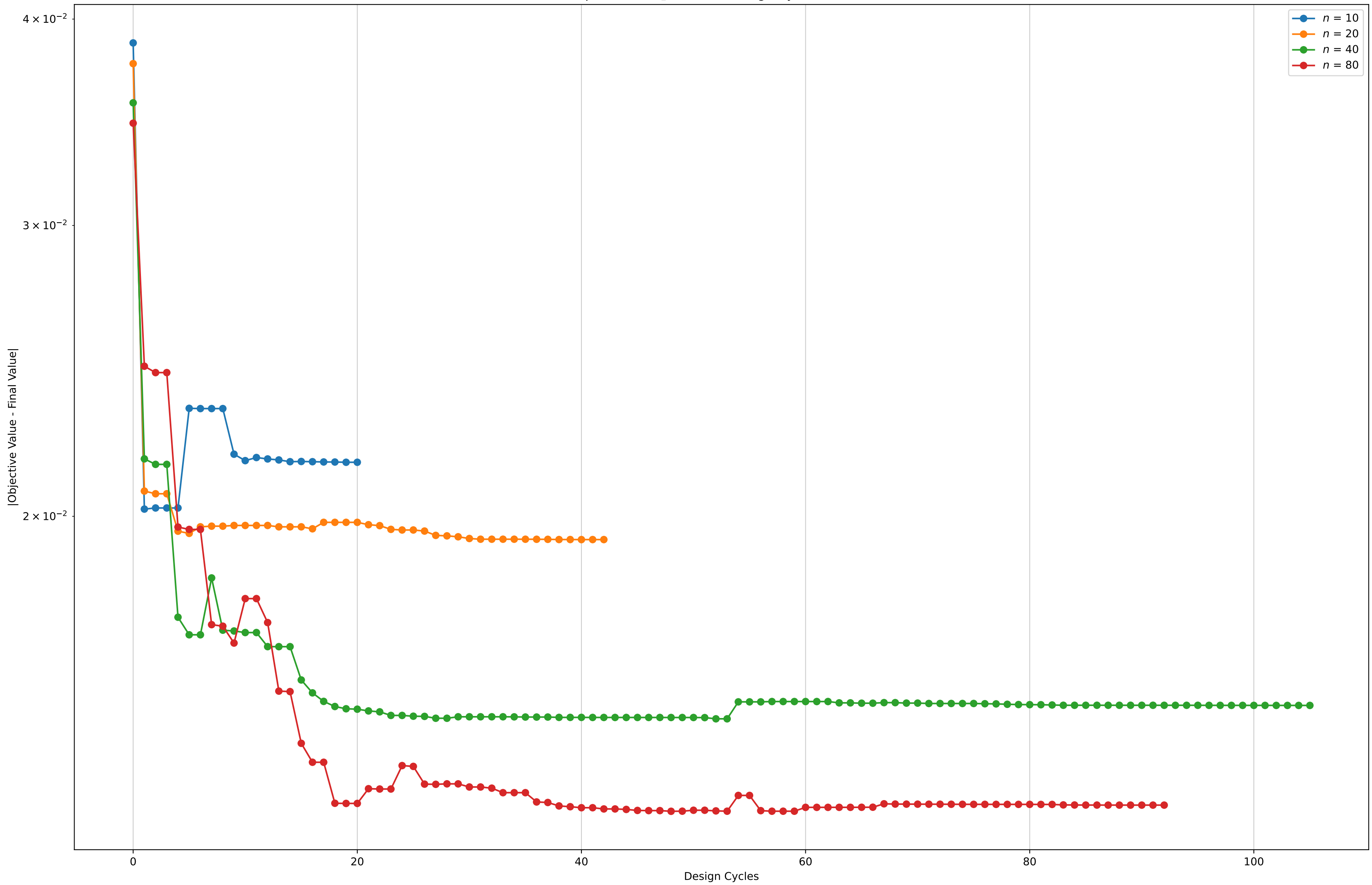Reduced-space BFGS Value vs Design Cycles, $m = 7778$

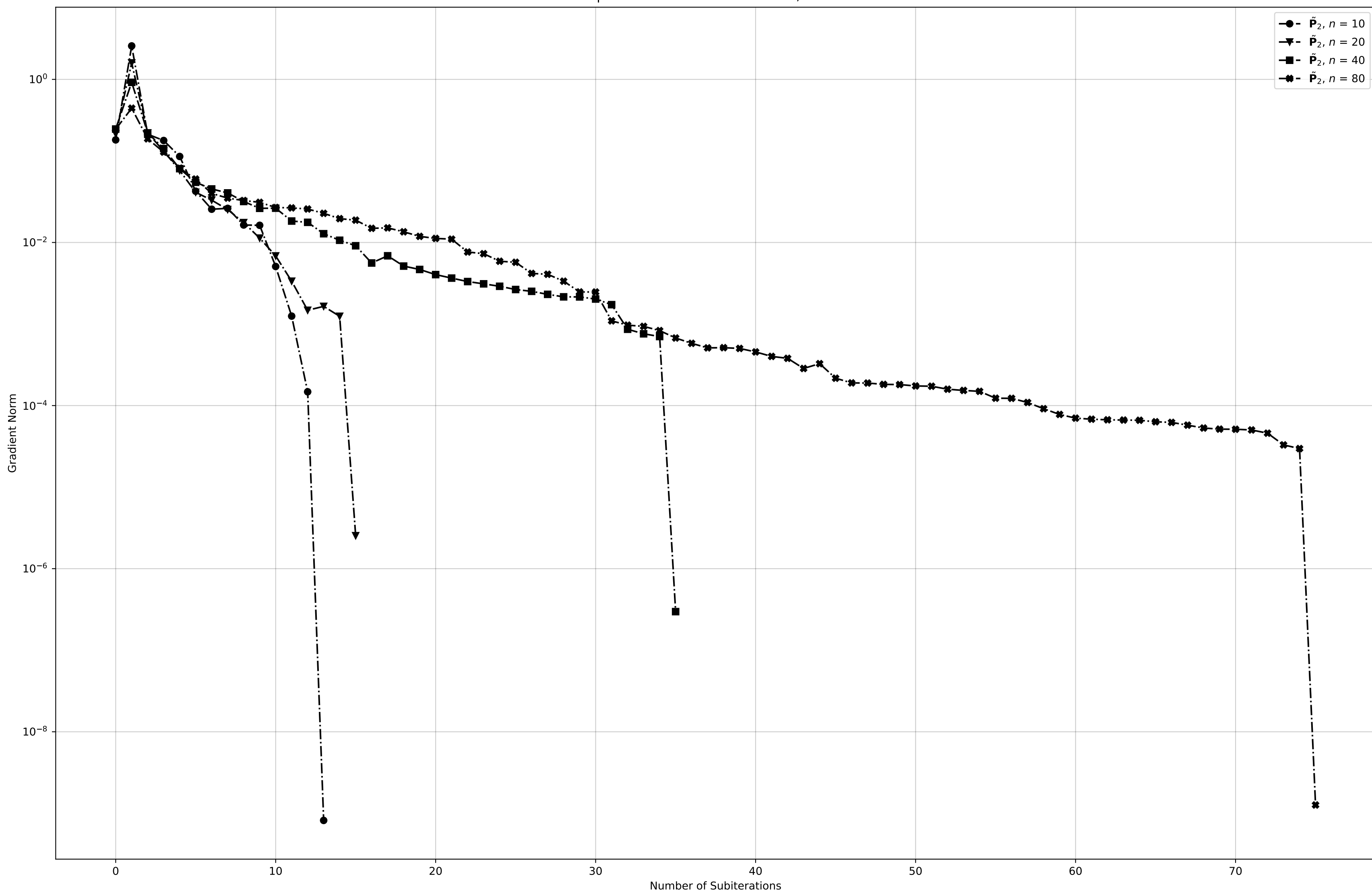Full-space with $\tilde{\mathbf{P}}_2$ Gradient vs Design Cycles, $m = 2594$

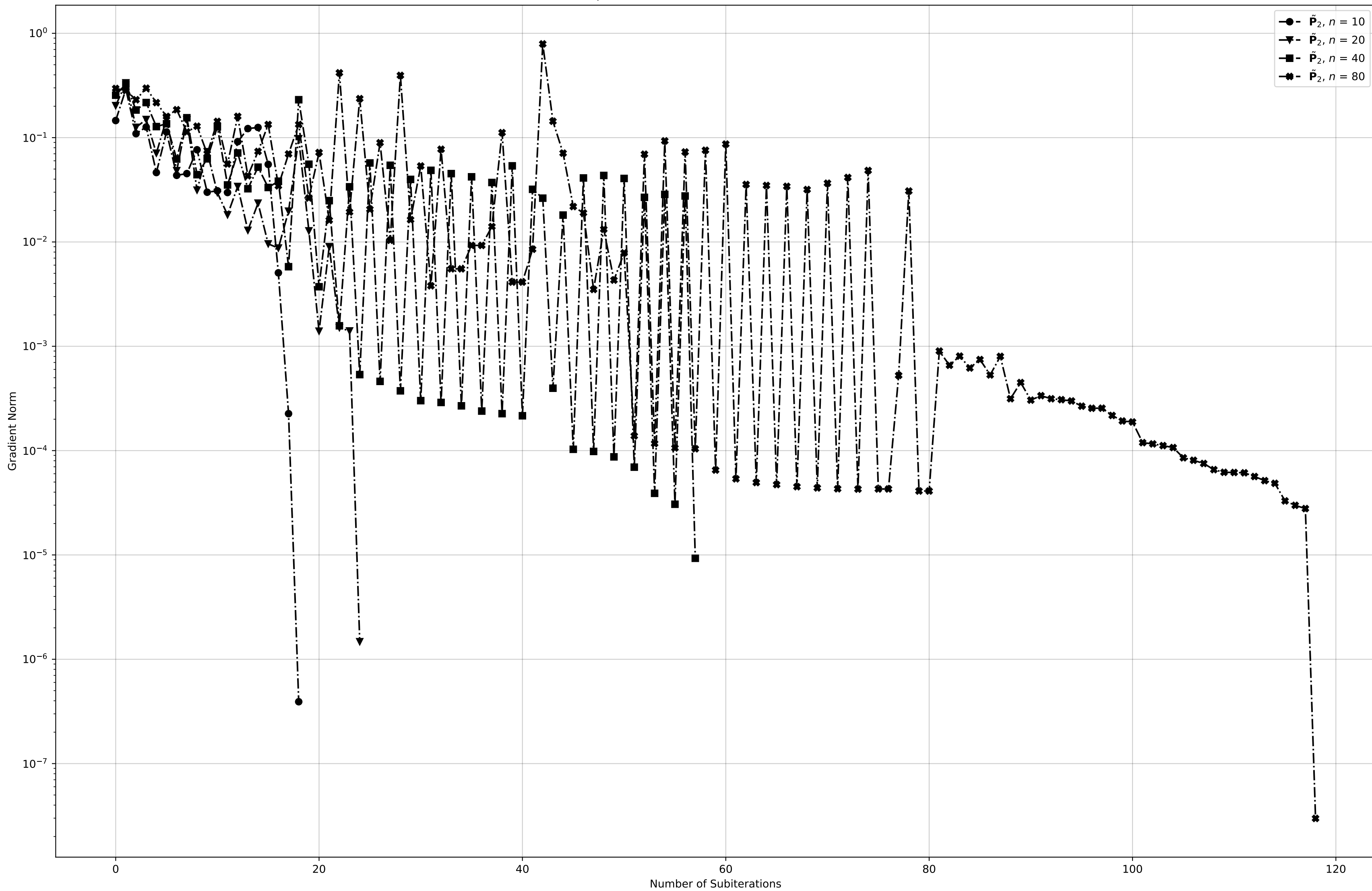Full-space with $\tilde{\mathbf{P}}_2$ Value vs Design Cycles, $m = 2594$

Full-space with $\tilde{\mathbf{P}}_2$ Gradient vs Design Cycles, $m = 5186$
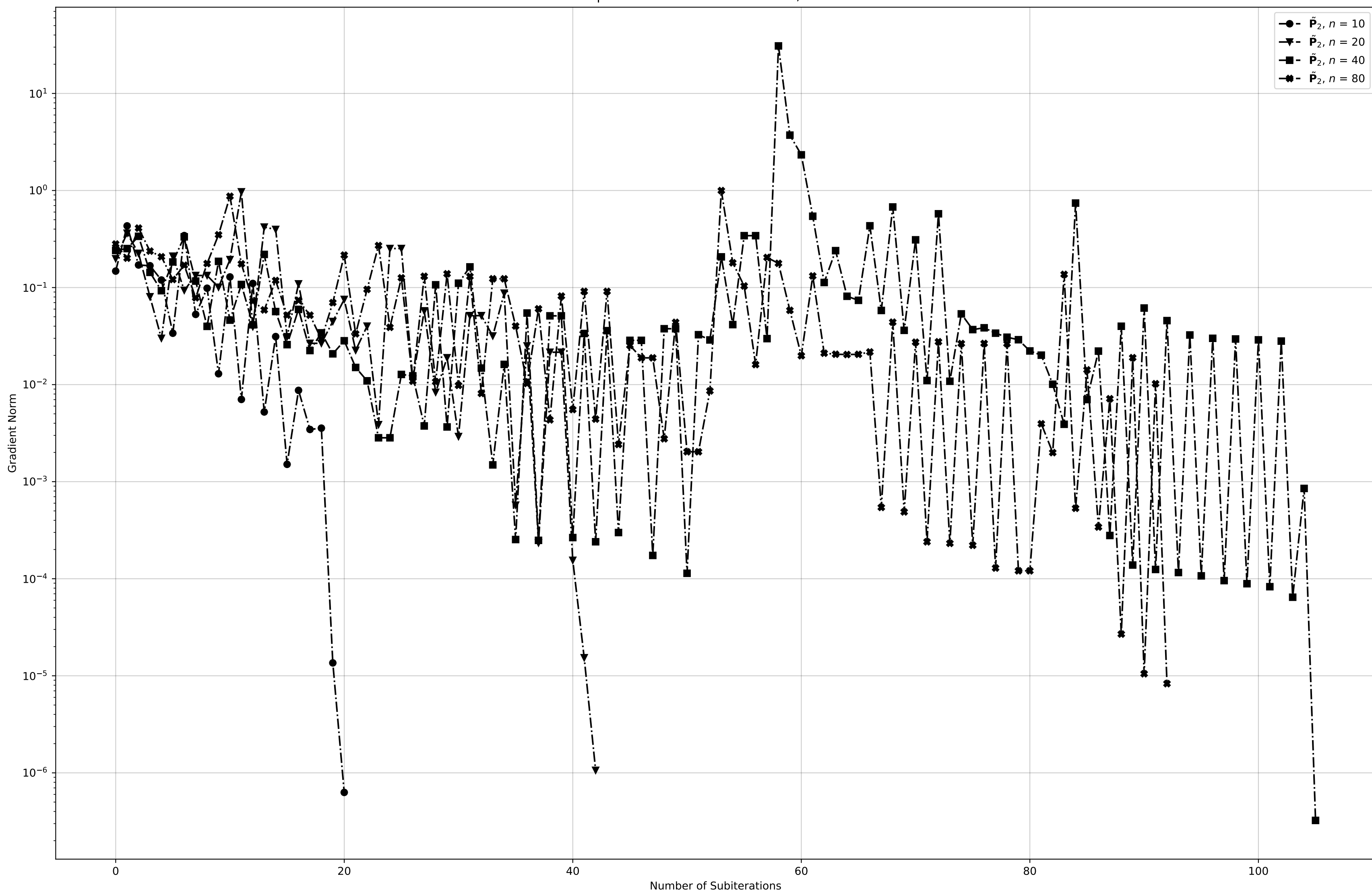
Full-space with $\tilde{\mathbf{P}}_2$ Value vs Design Cycles, $m = 5186$

Full-space with $\tilde{\mathbf{P}}_2$ Gradient vs Design Cycles, $m = 7778$
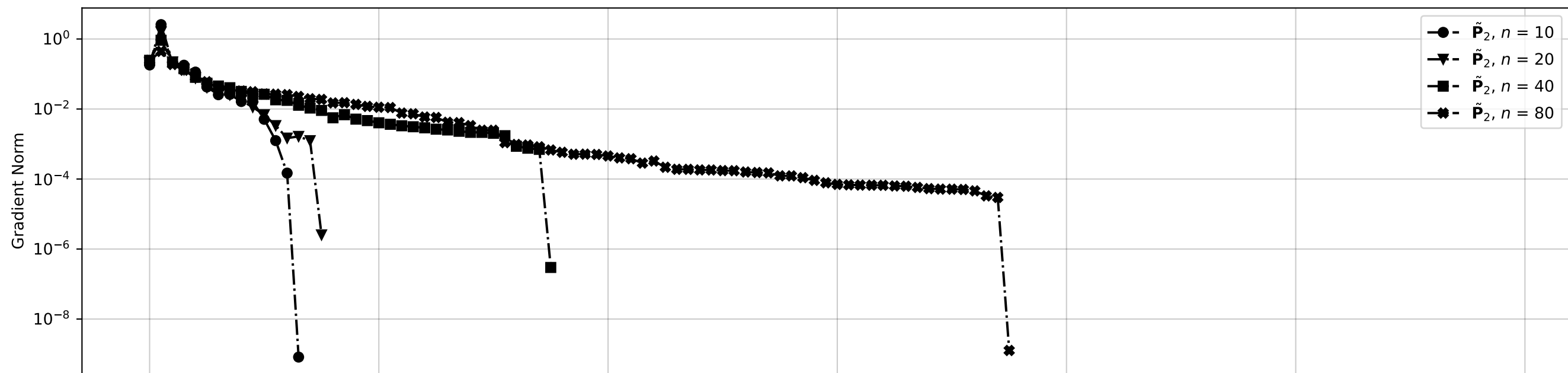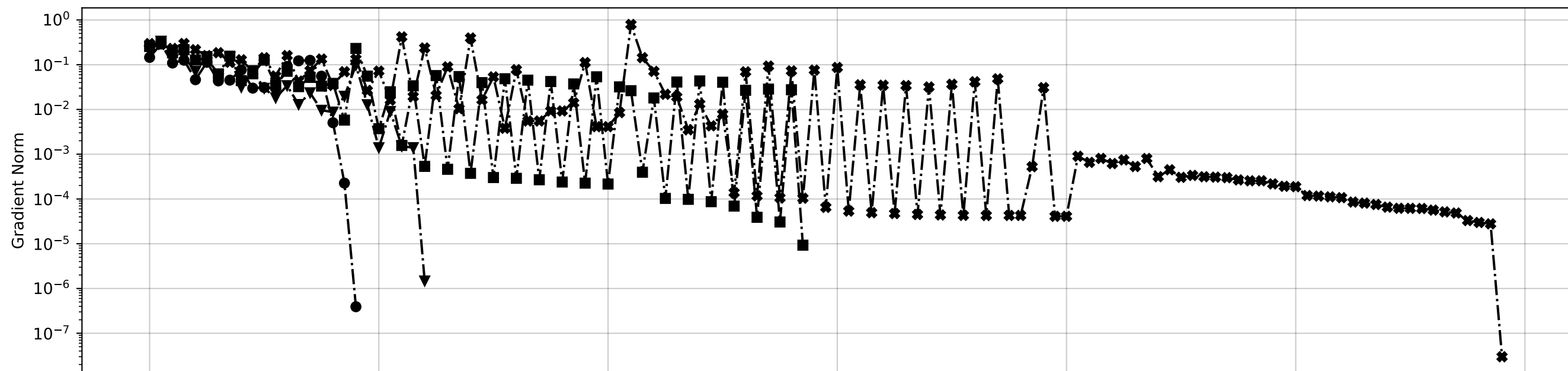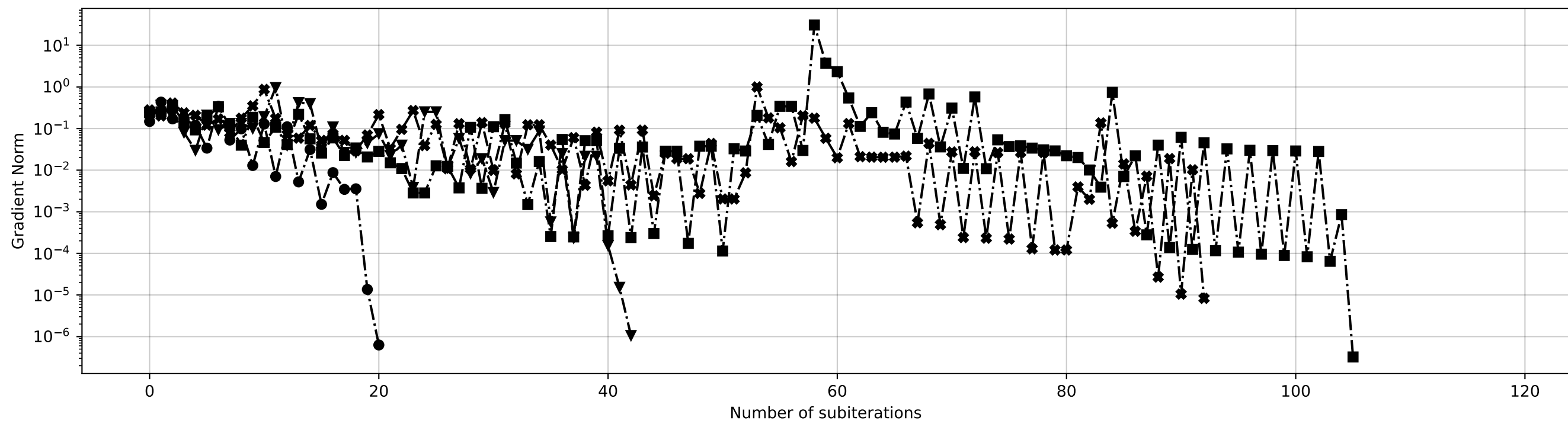
Full-space with $\tilde{\mathbf{P}}_2$ Value vs Design Cycles, $m = 7778$

Full-space Gradient vs Subiterations, $m = 2594$
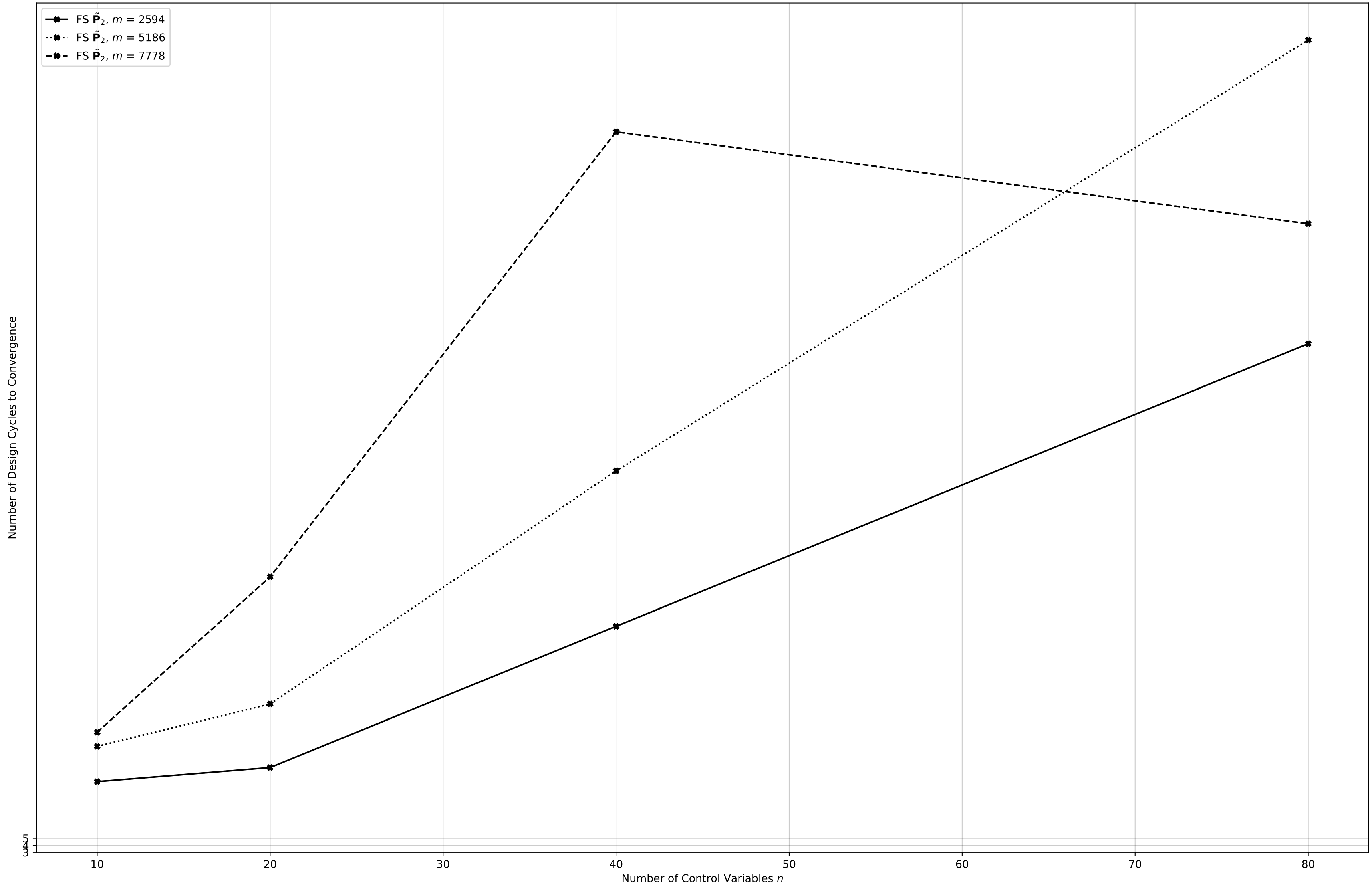
Full-space Gradient vs Subiterations, $m = 5186$

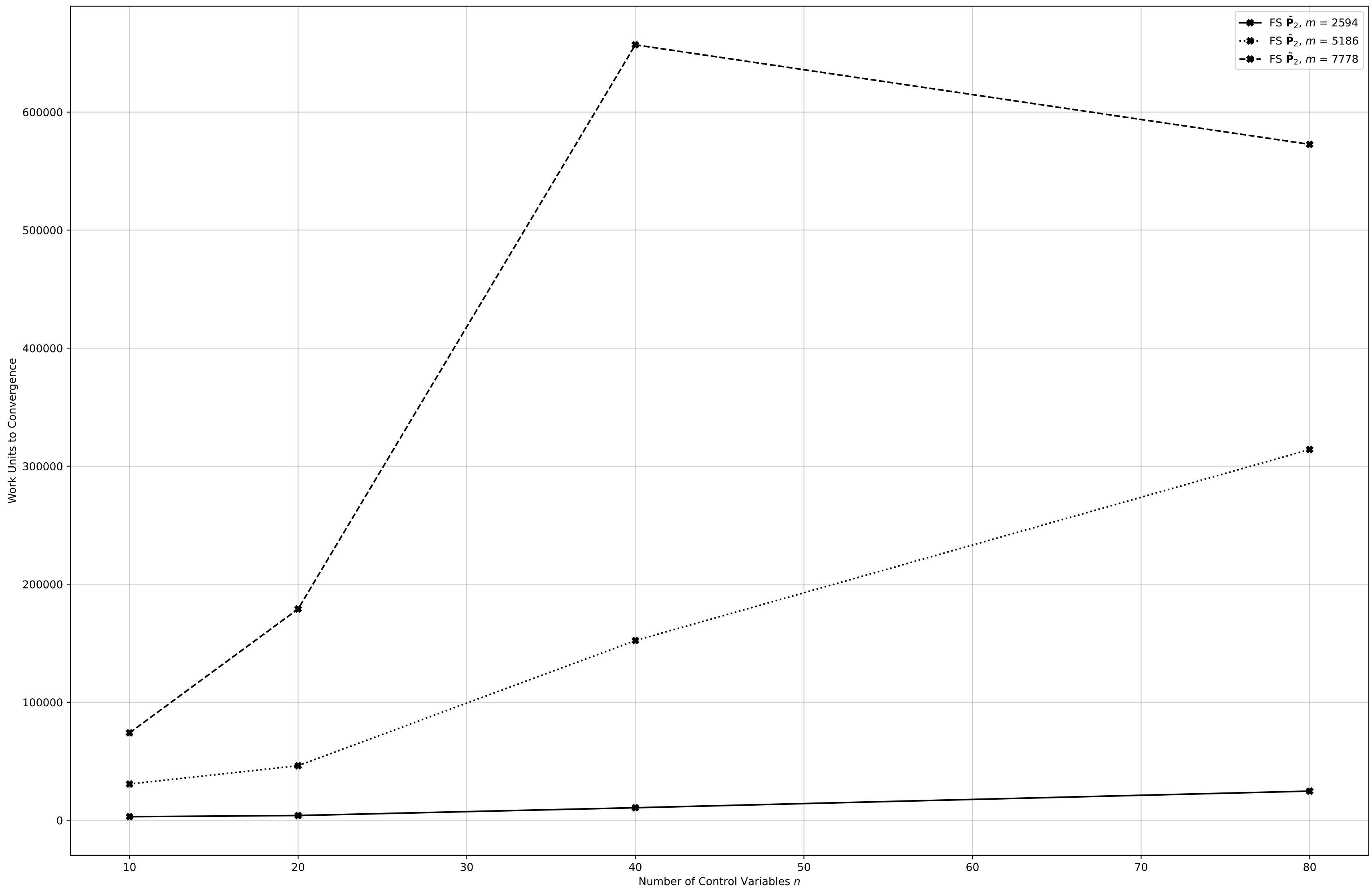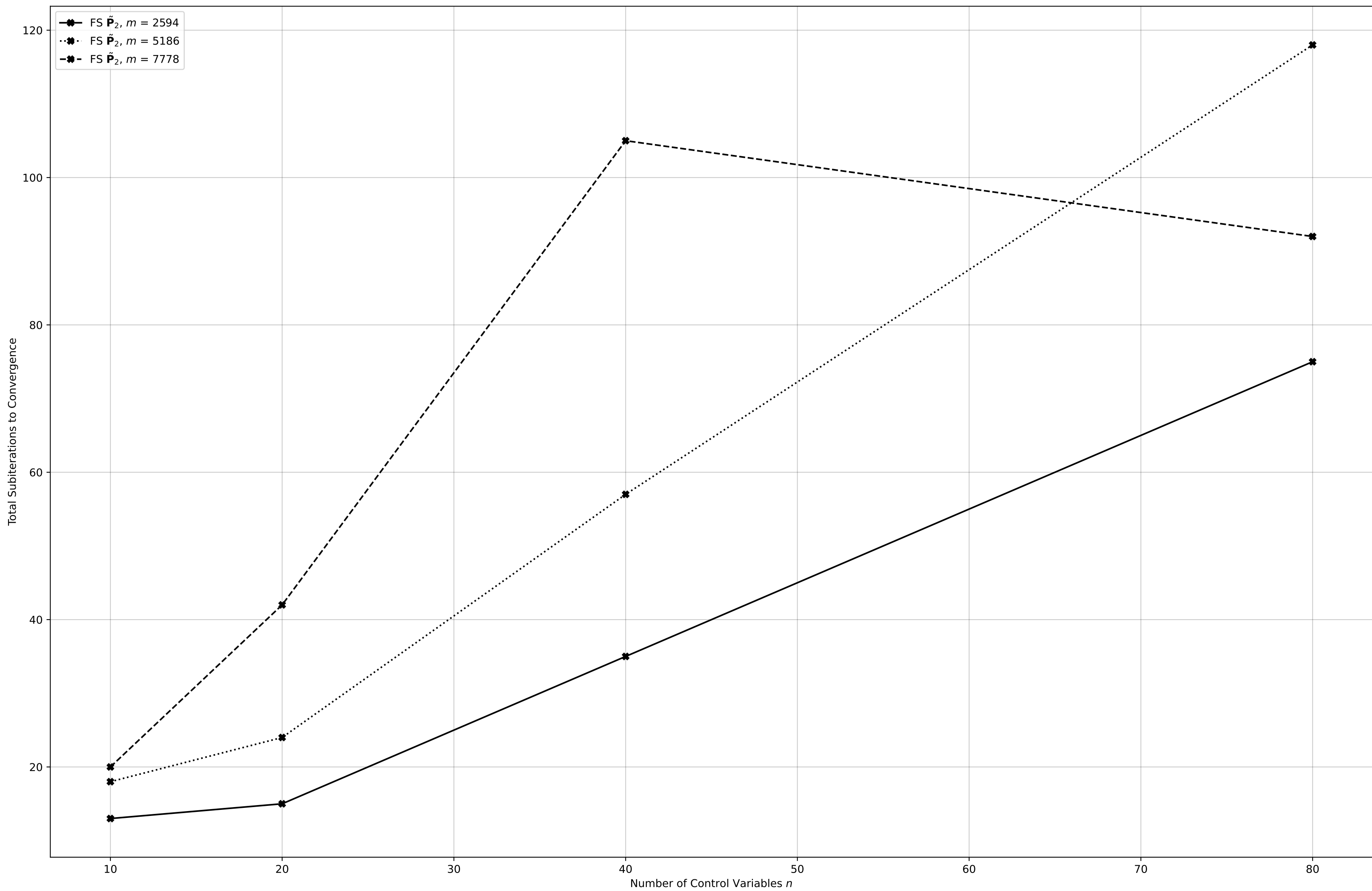Full-space Gradient vs Subiterations, $m = 7778$

Full-space Gradient vs Subiterations

Full-space Design Cycles vs Control Variables

Work Units vs Control Variables
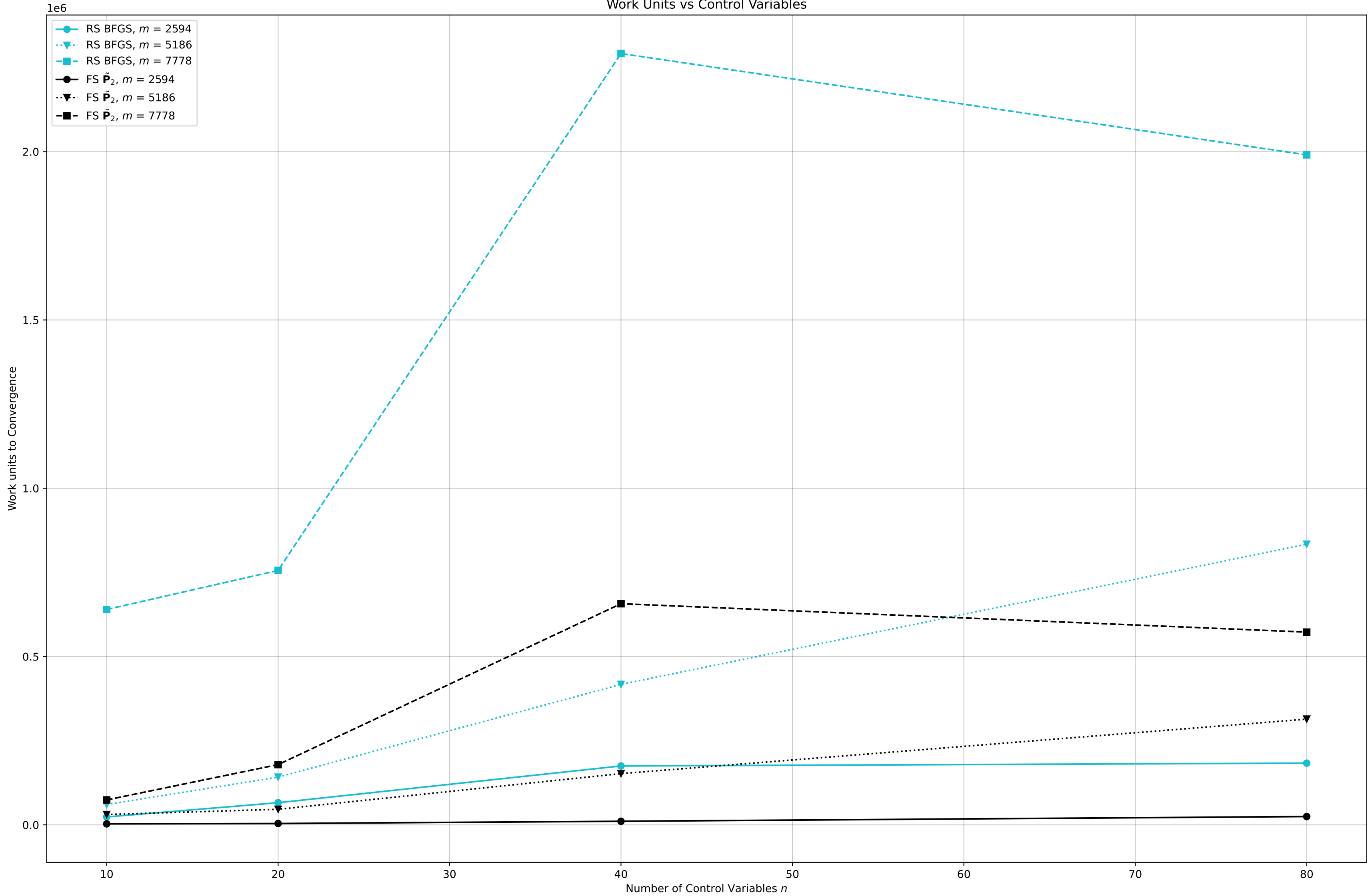
Total Subiterations vs Control Variables

Legend:
- FS $\tilde{\mathbf{P}}_2$, $m = 2594$
- FS $\tilde{\mathbf{P}}_2$, $m = 5186$
- FS $\tilde{\mathbf{P}}_2$, $m = 7778$

Y-axis: Total Subiterations to Convergence

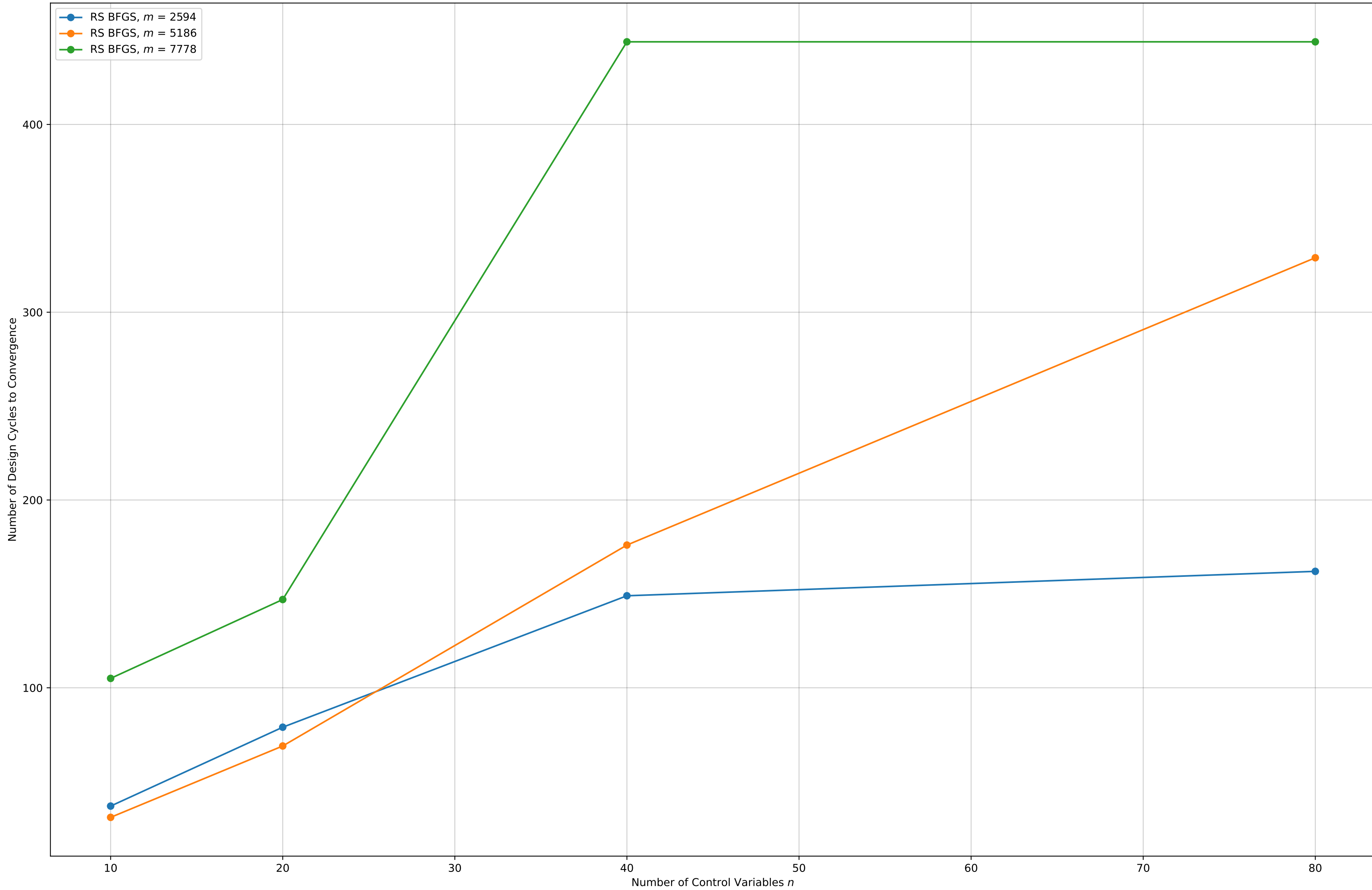X-axis: Number of Control Variables n
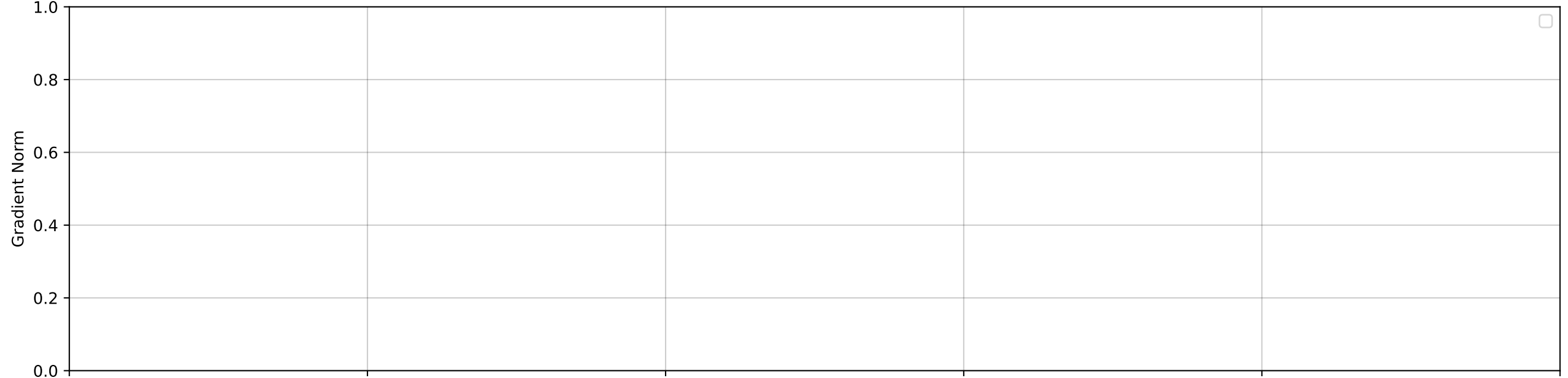
Work Units vs Control Variables

Reduced-space Design Cycles vs Control Variables

Reduced-space Gradient vs Design Cycles

$m = 2594$

Gradient Norm

$m = 5186$

Gradient Norm

$m = 7778$

Gradient Norm
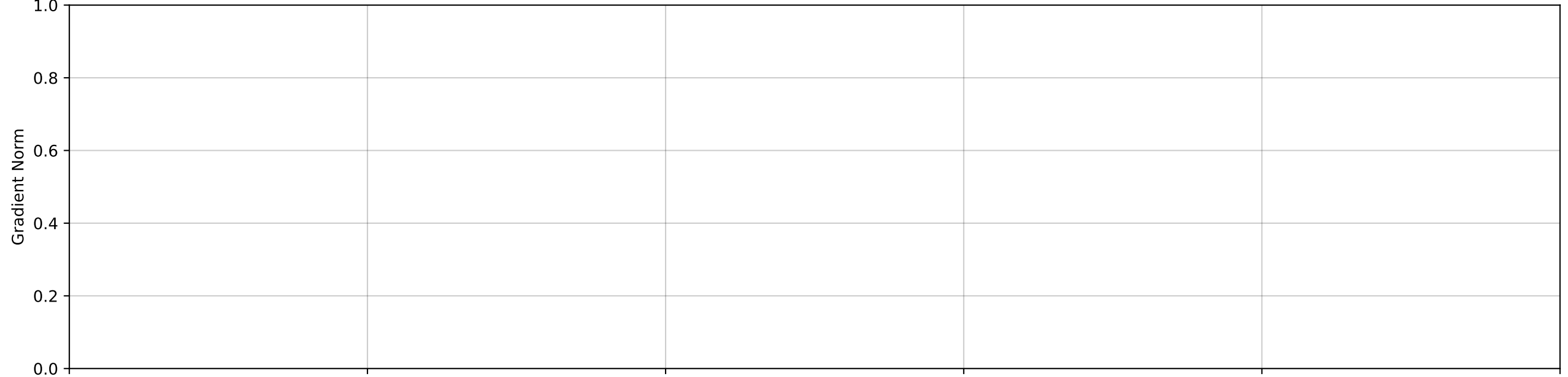
Design Cycles
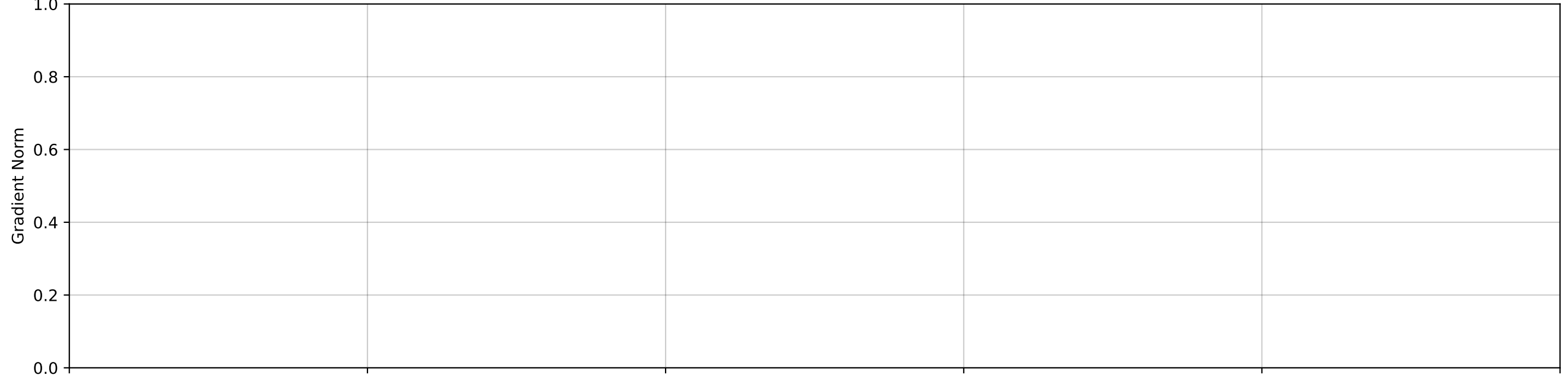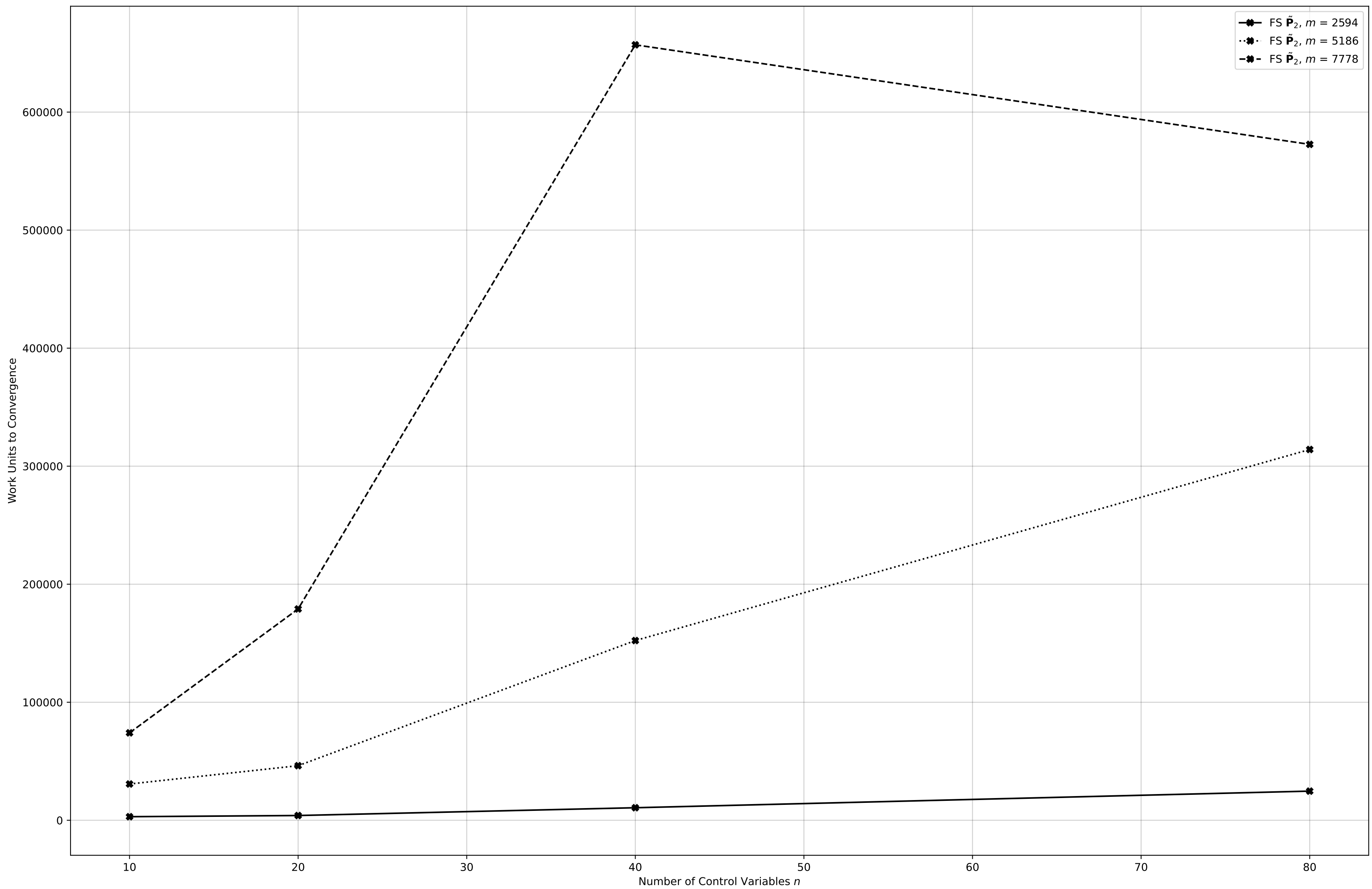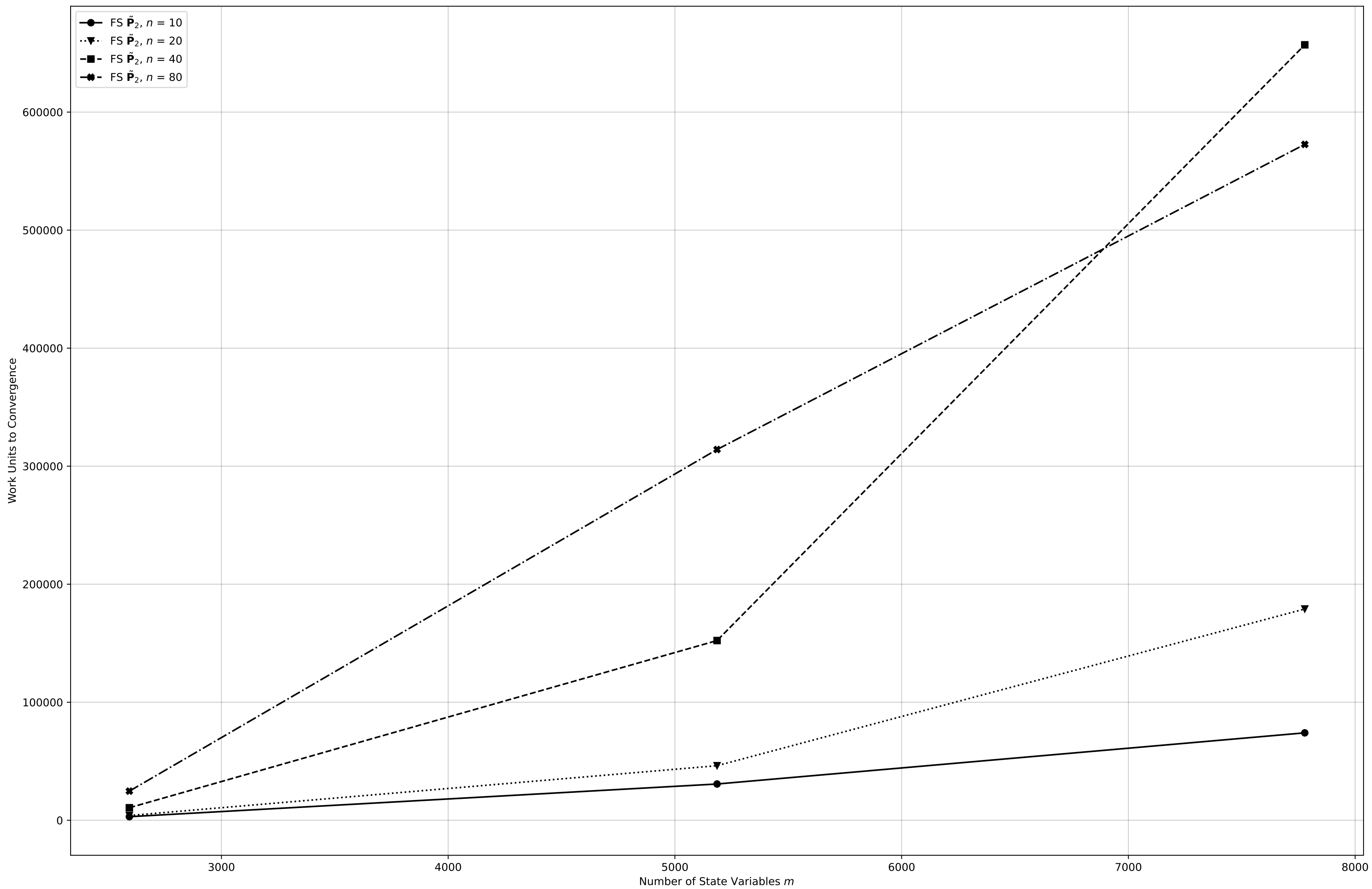
Work Units vs Control Variables

Work Units vs State Variables

Gradient Norm vs Design Cycles m = 5186