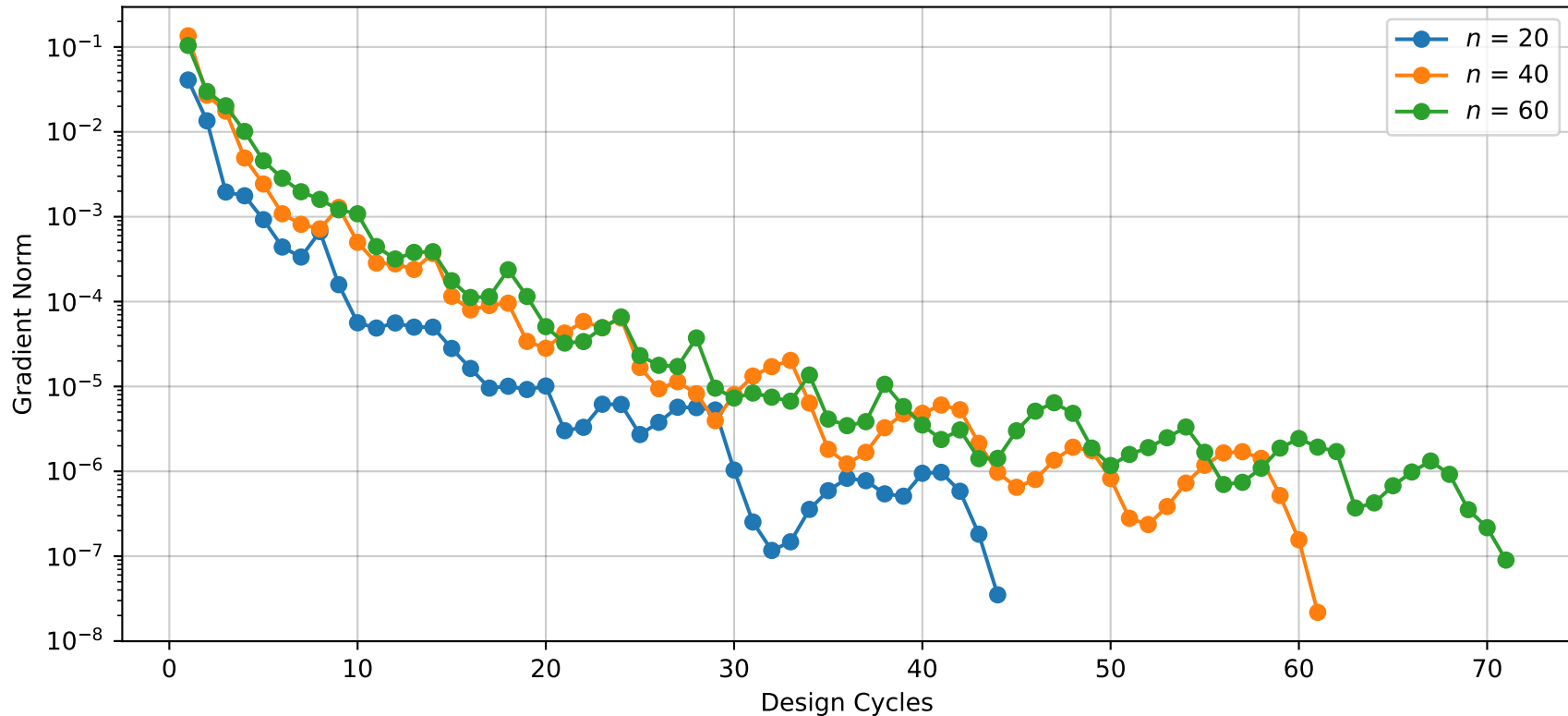
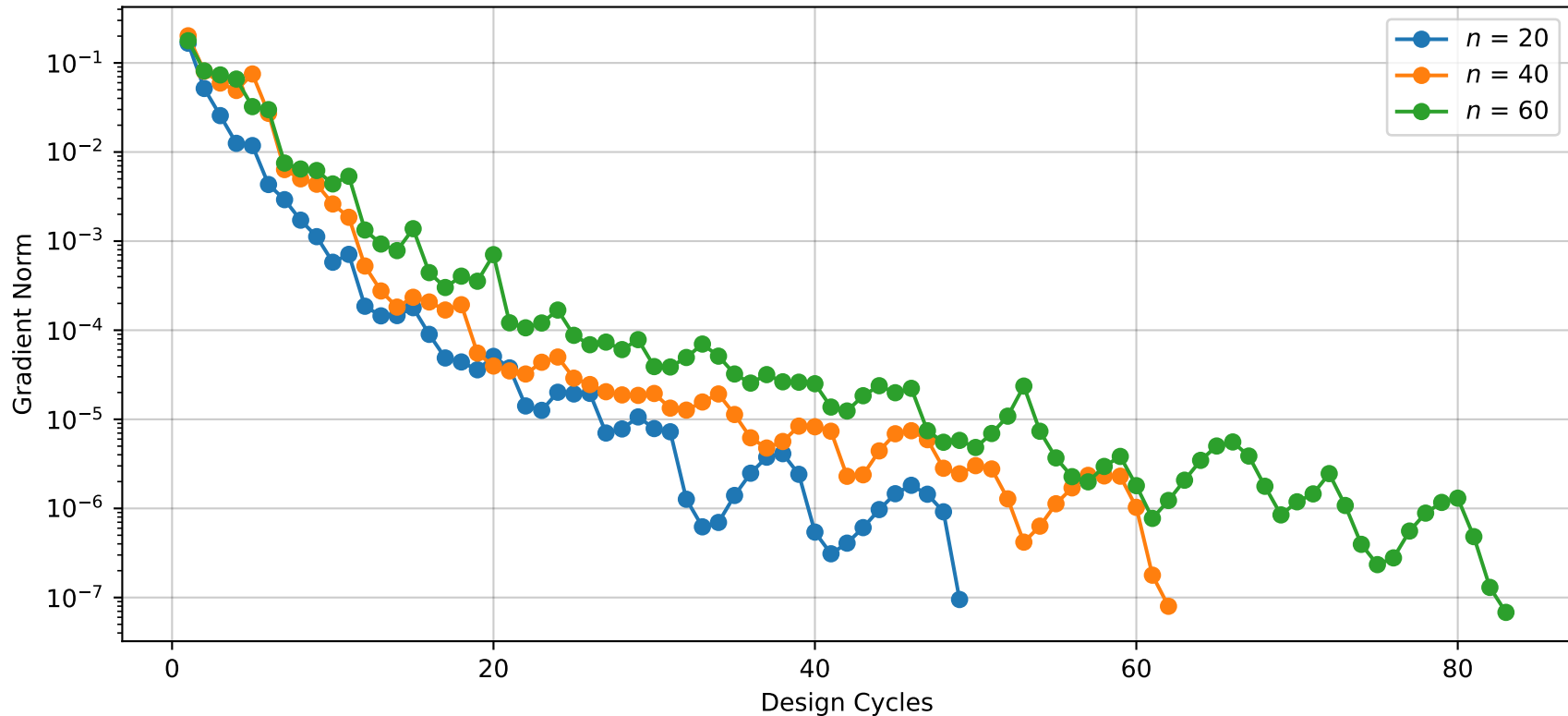


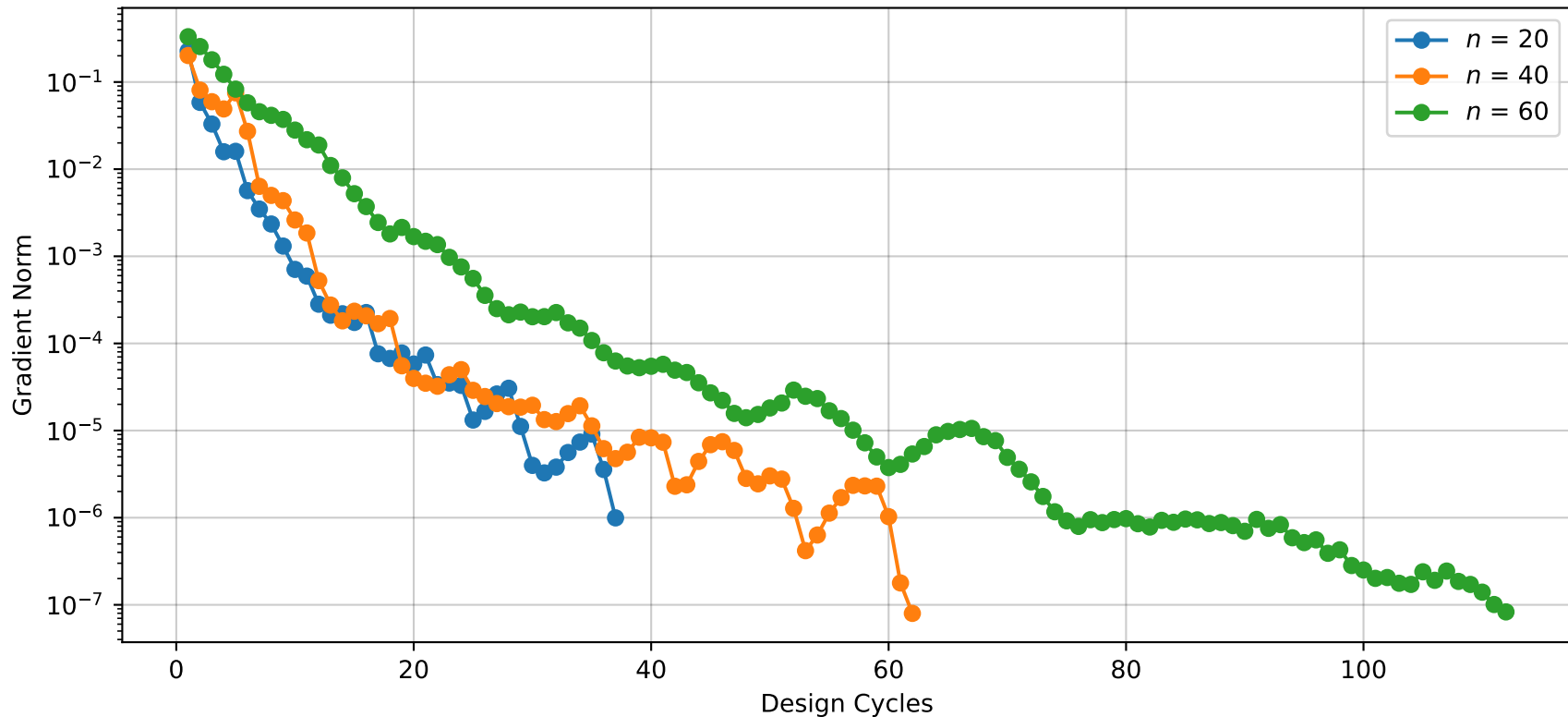
Reduced-space BFGS Gradient vs Design Cycles, $m = 8248$



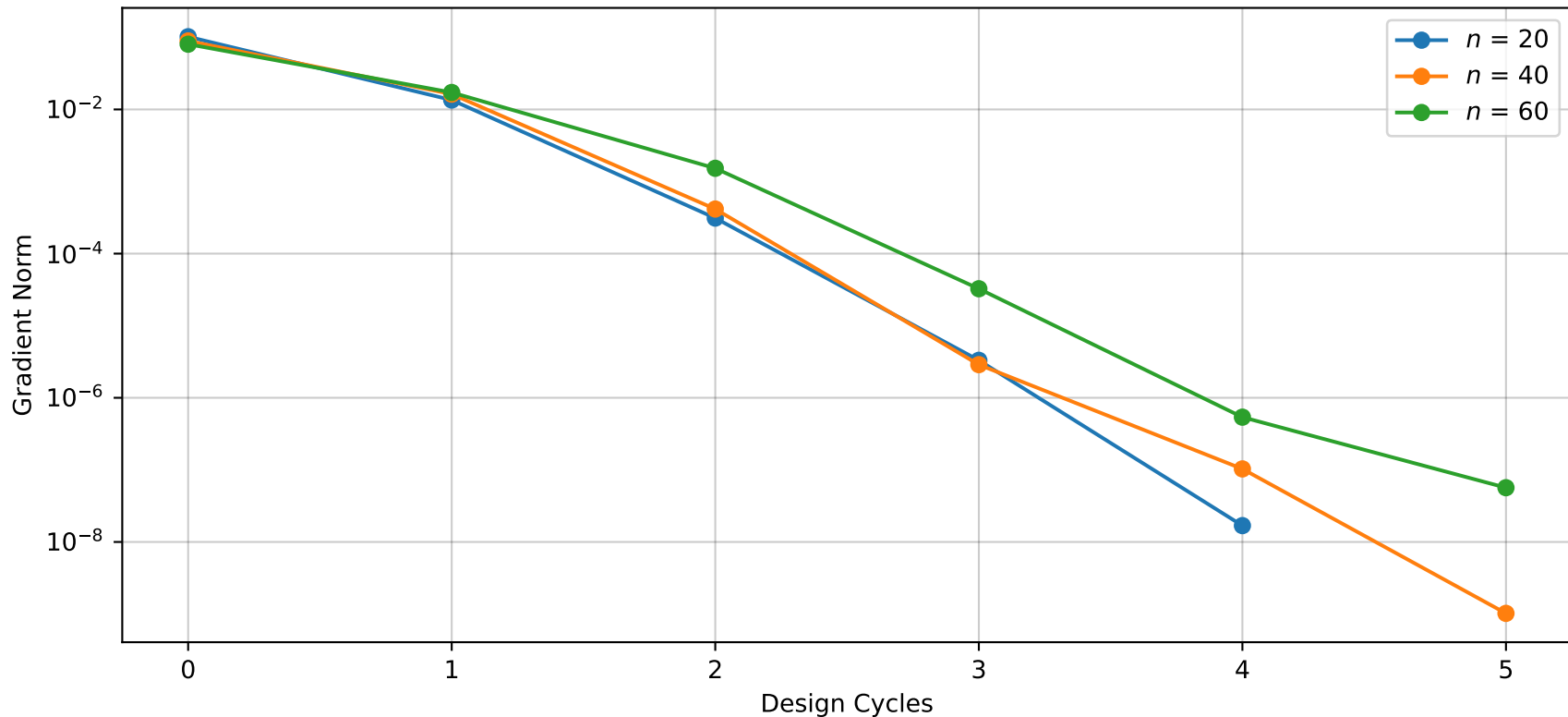
Reduced-space BFGS Gradient vs Design Cycles, $m = 32992$



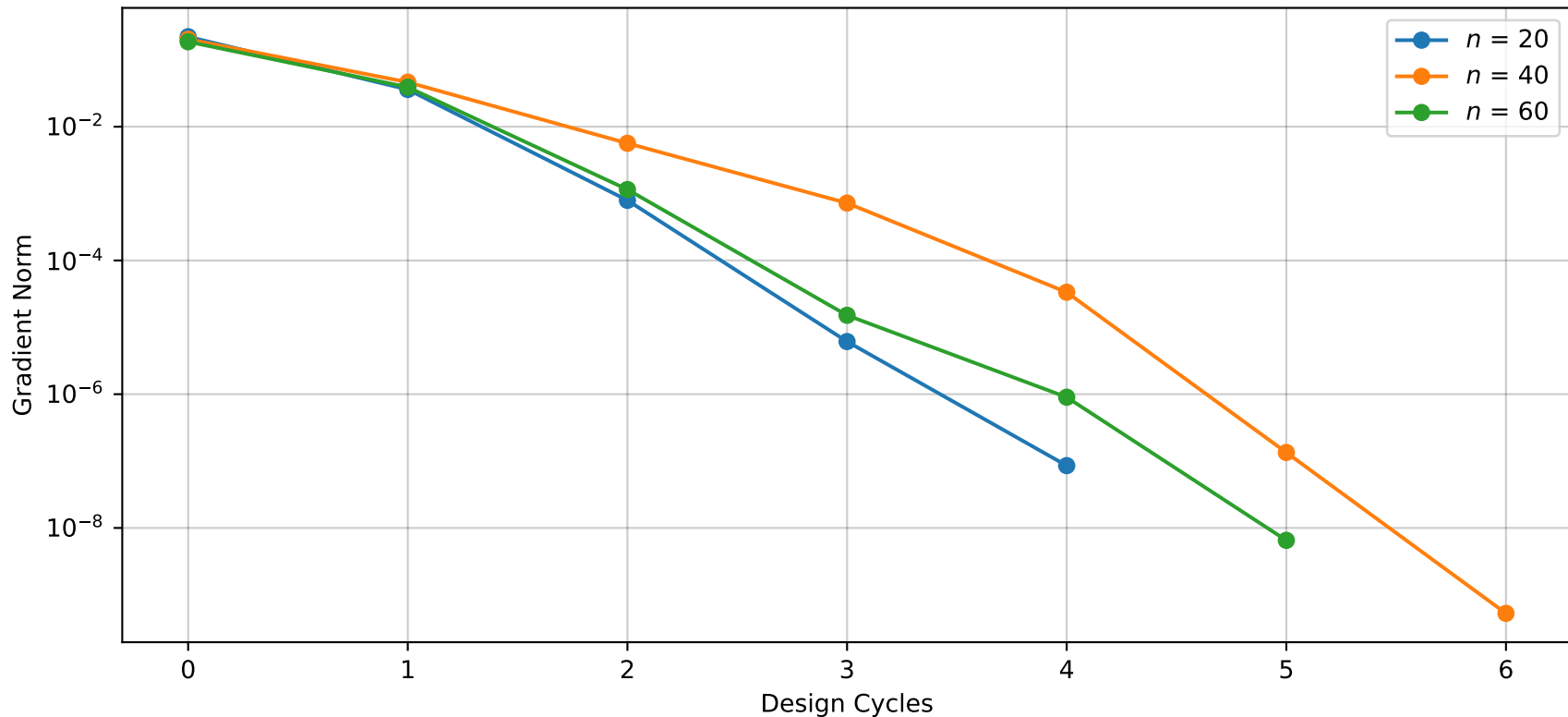
Reduced-space BFGS Gradient vs Design Cycles, $m = 74232$



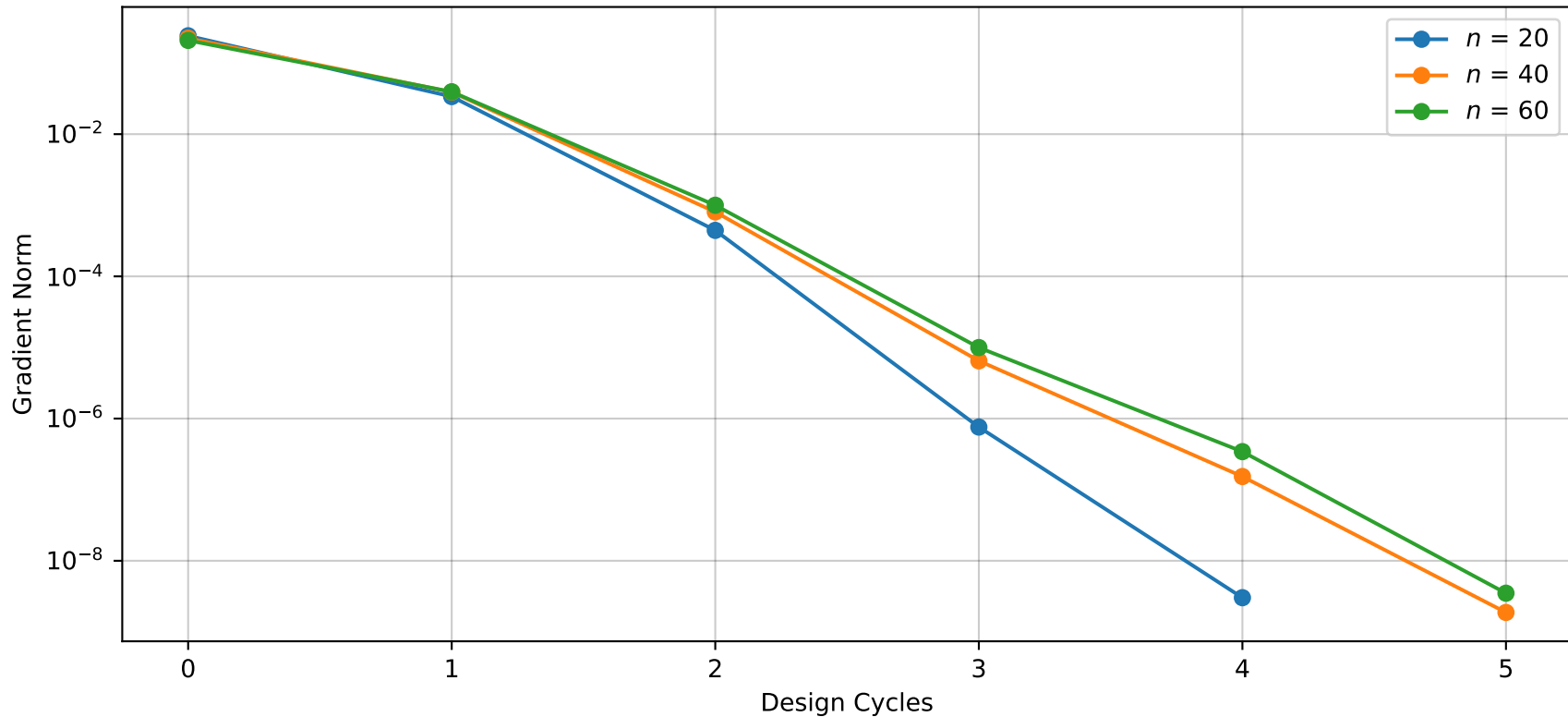
Reduced-space Newton Gradient vs Design Cycles, $m = 8248$



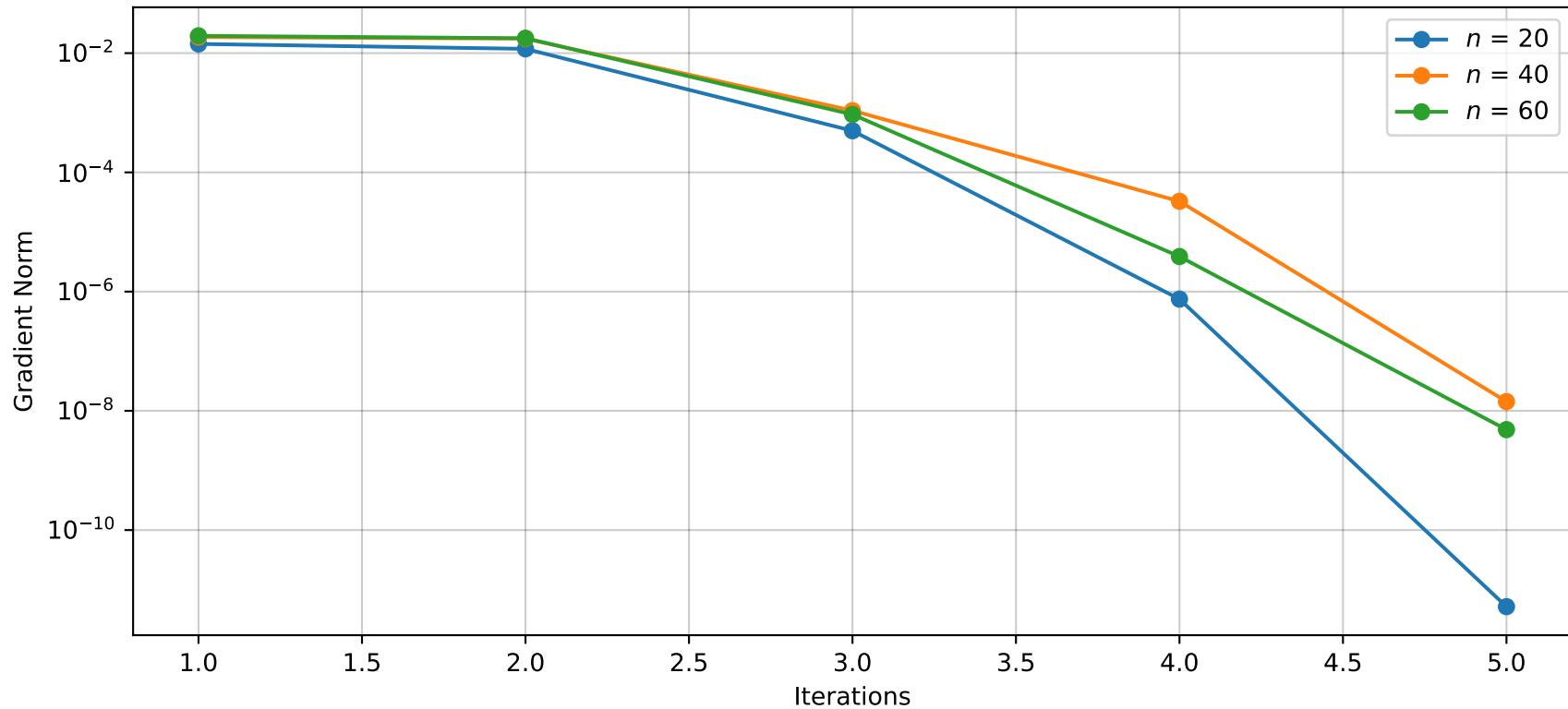
Reduced-space Newton Gradient vs Design Cycles, $m = 32992$



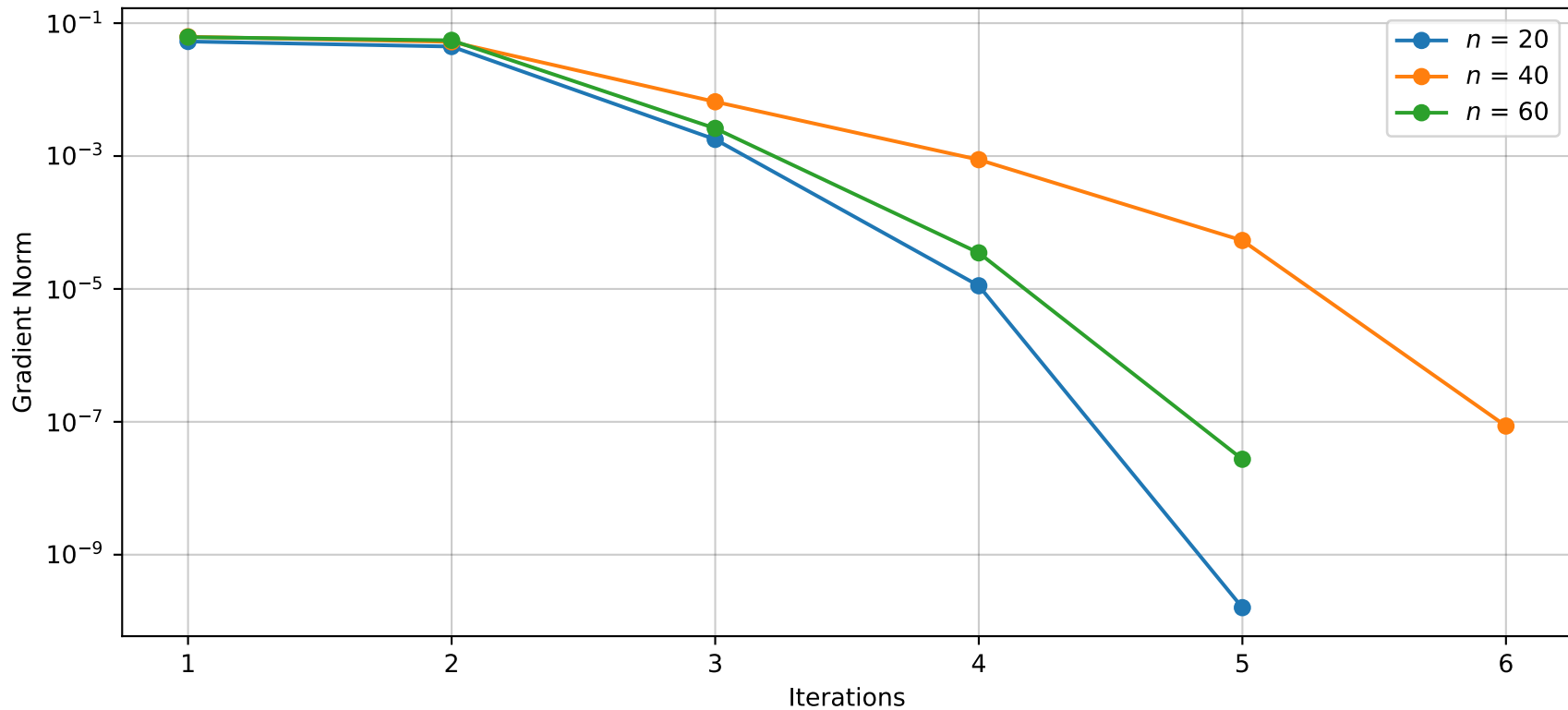
Reduced-space Newton Gradient vs Design Cycles, $m = 74232$



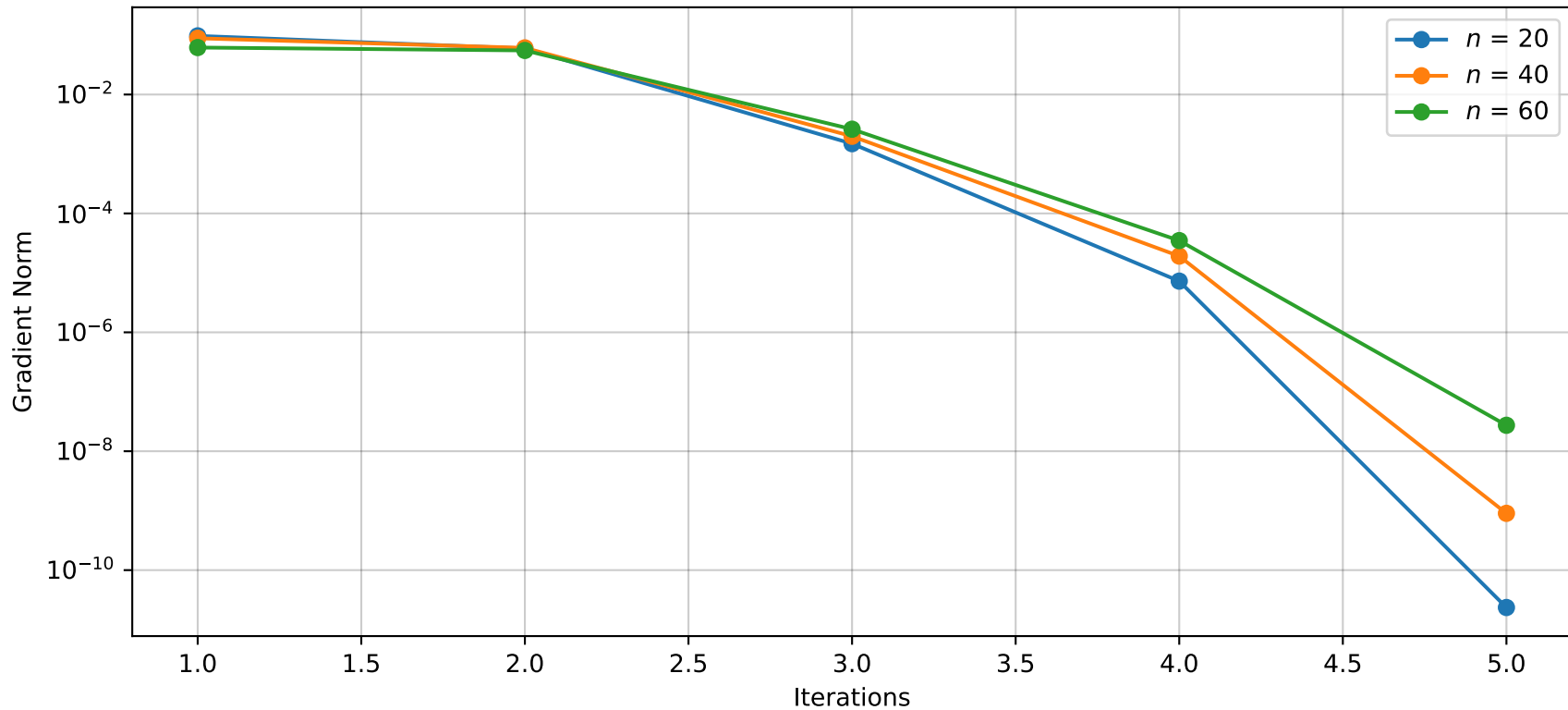
Full-space with $\tilde{\mathbf{P}}_2$ Gradient vs Design Cycles, $m = 8248$



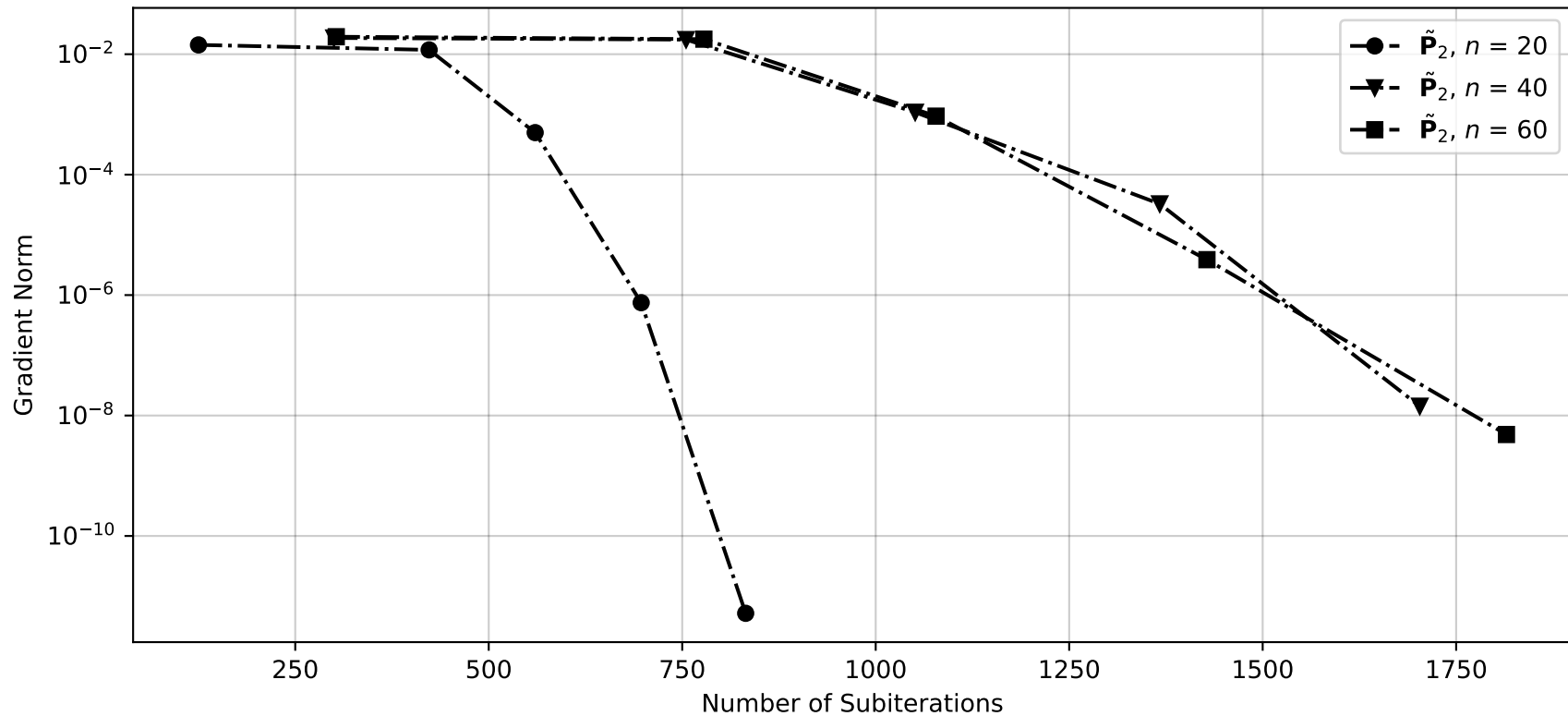
Full-space with $\tilde{\mathbf{P}}_2$ Gradient vs Design Cycles, $m = 32992$



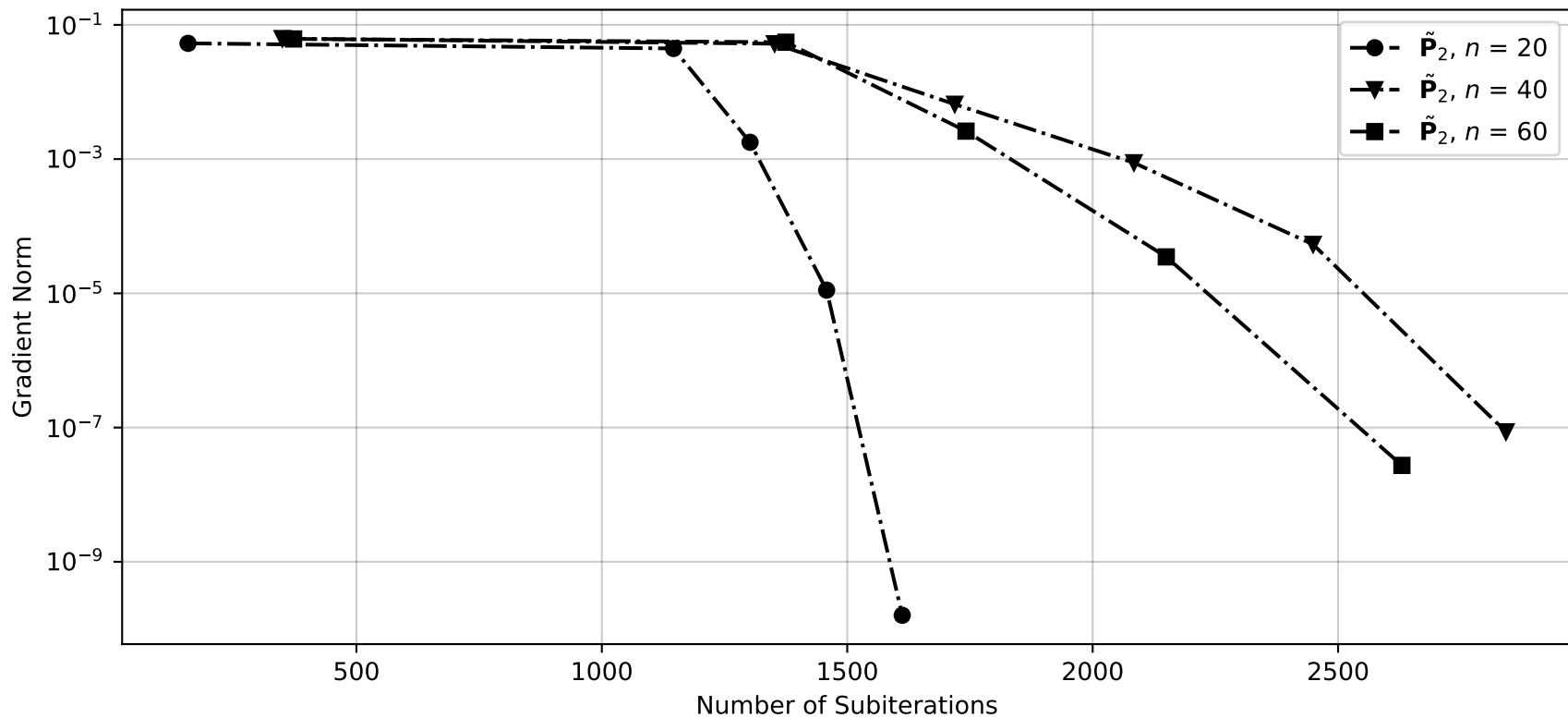
Full-space with $\tilde{\mathbf{P}}_2$ Gradient vs Design Cycles, $m = 74232$



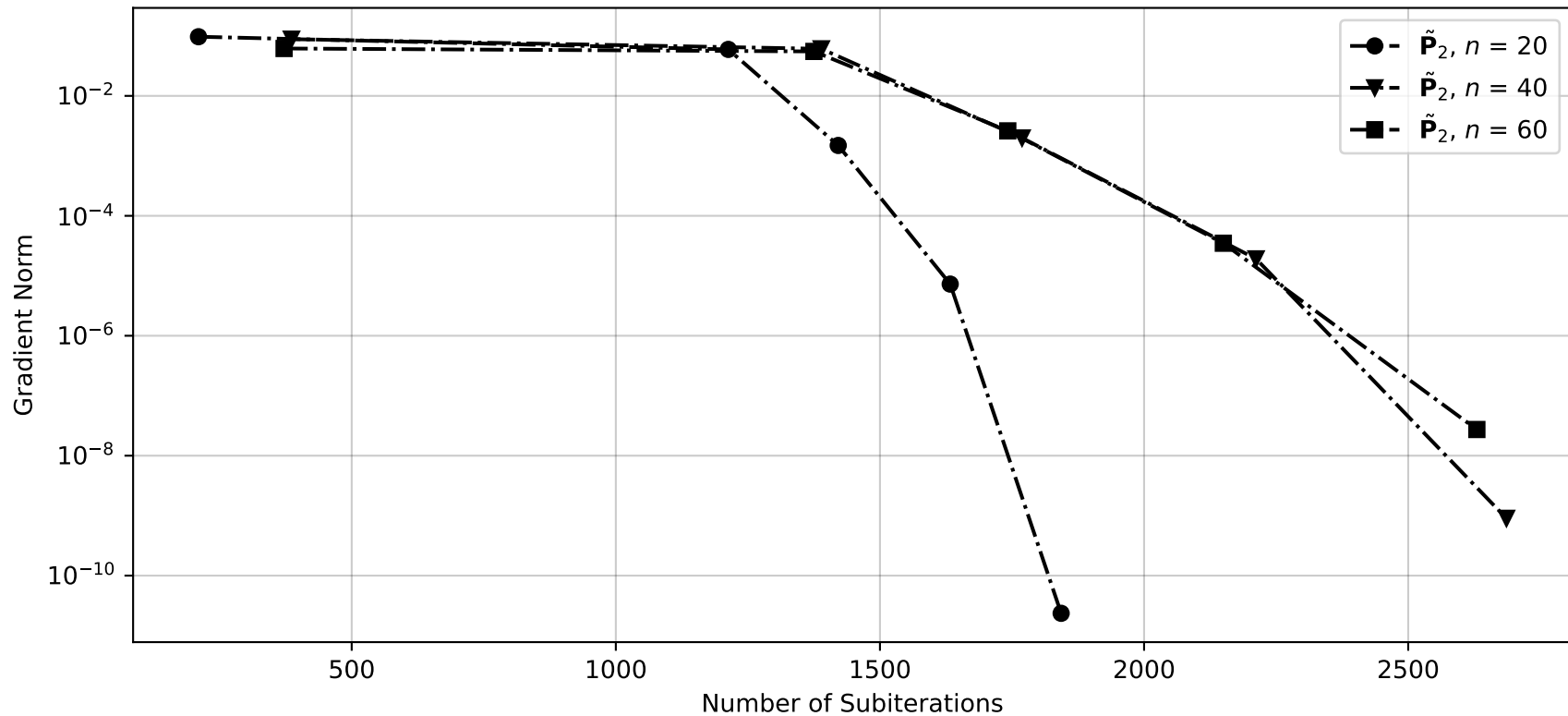
Full-space Gradient vs Subiterations, $m = 8248$



Full-space Gradient vs Subiterations, $m = 32992$

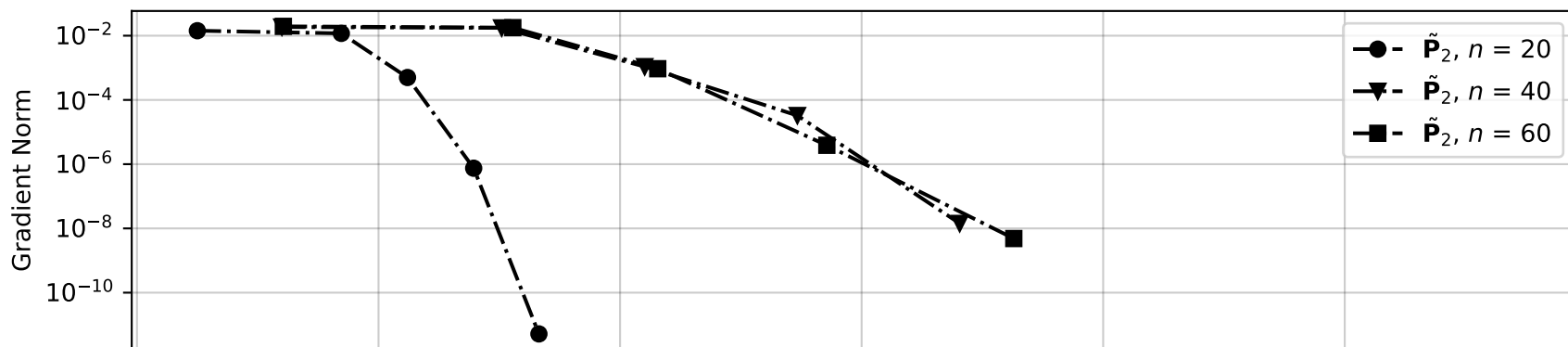


Full-space Gradient vs Subiterations, $m = 74232$

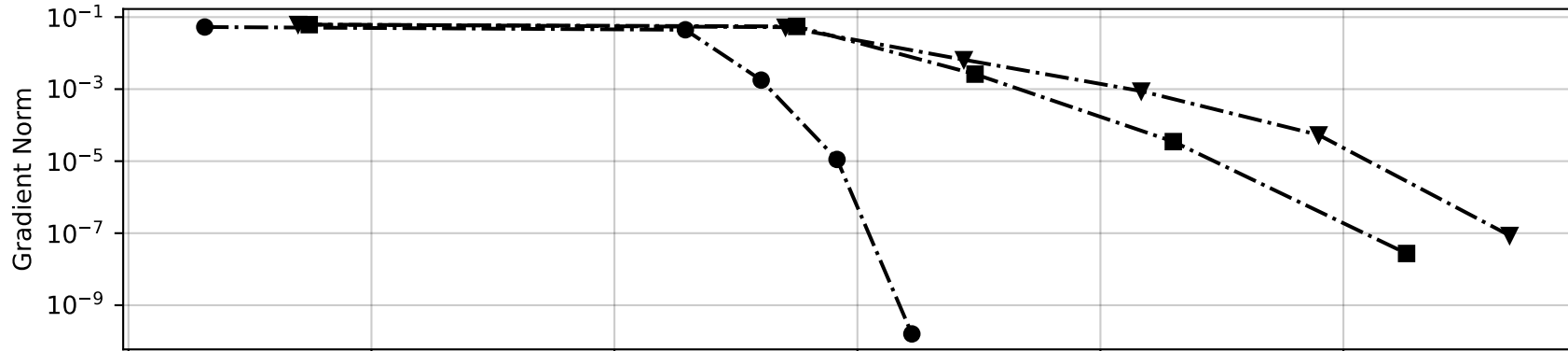


Full-space Gradient vs Subiterations

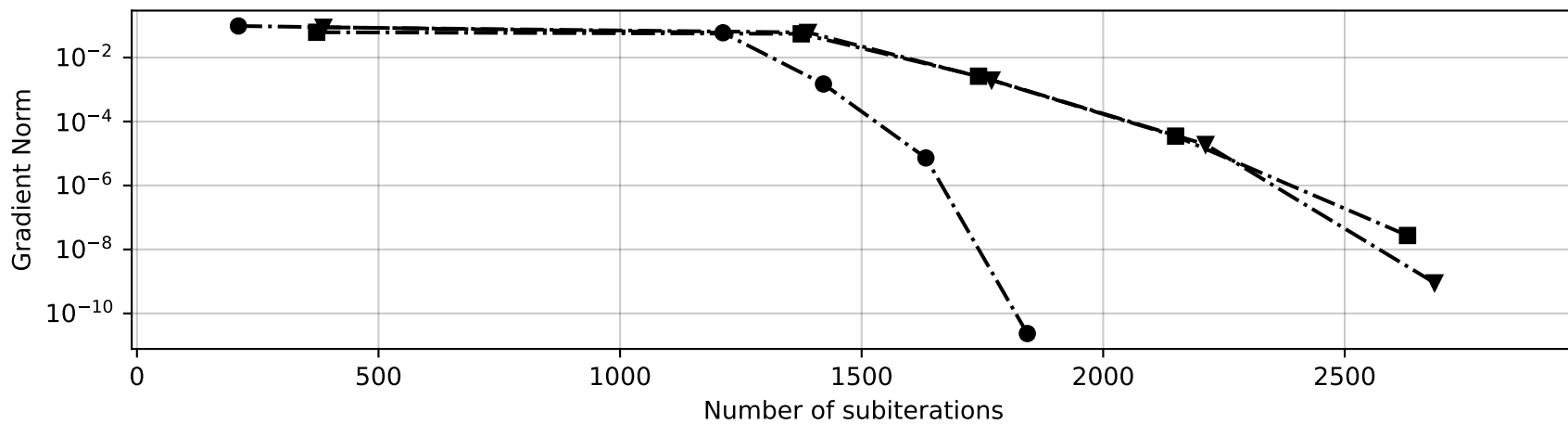
State Variables, $m = 8248$



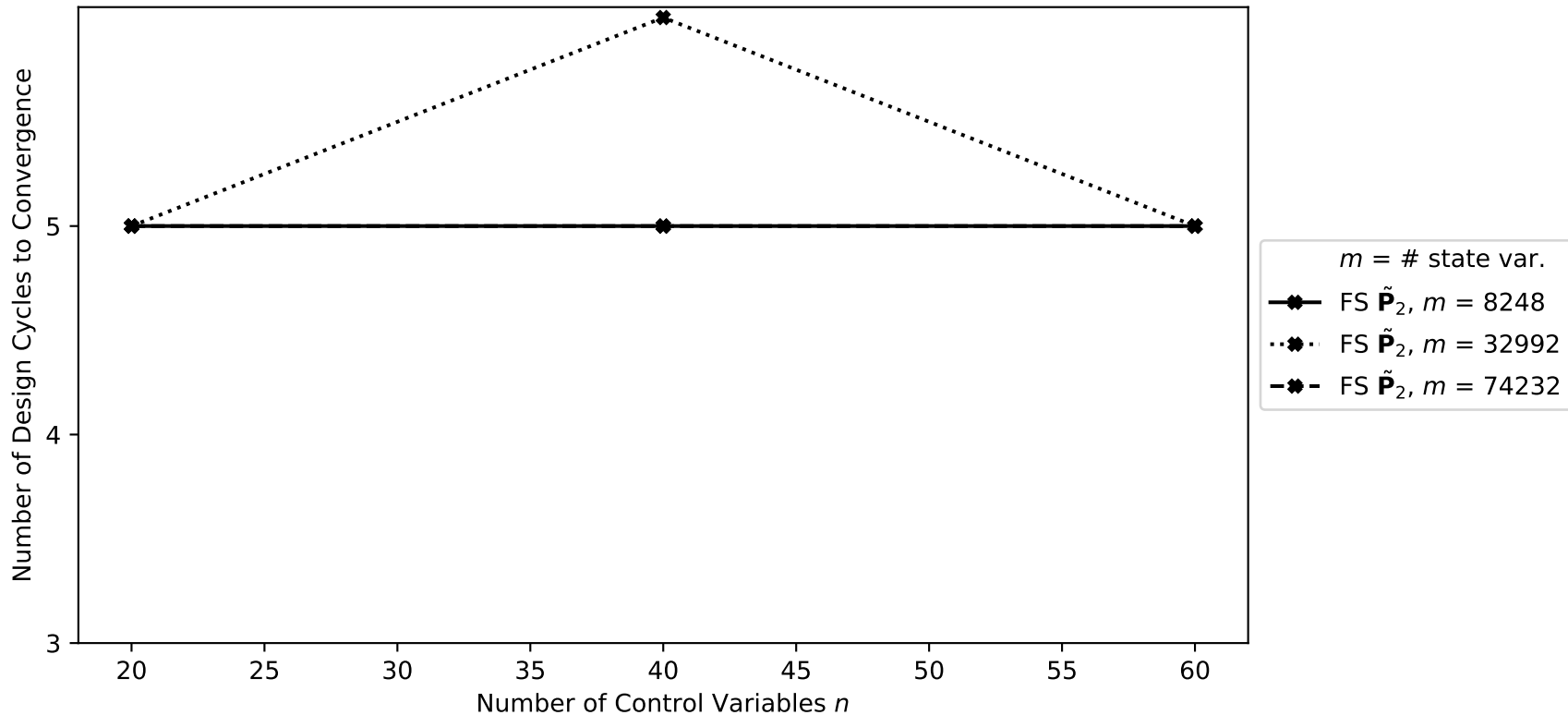
State Variables, $m = 32992$



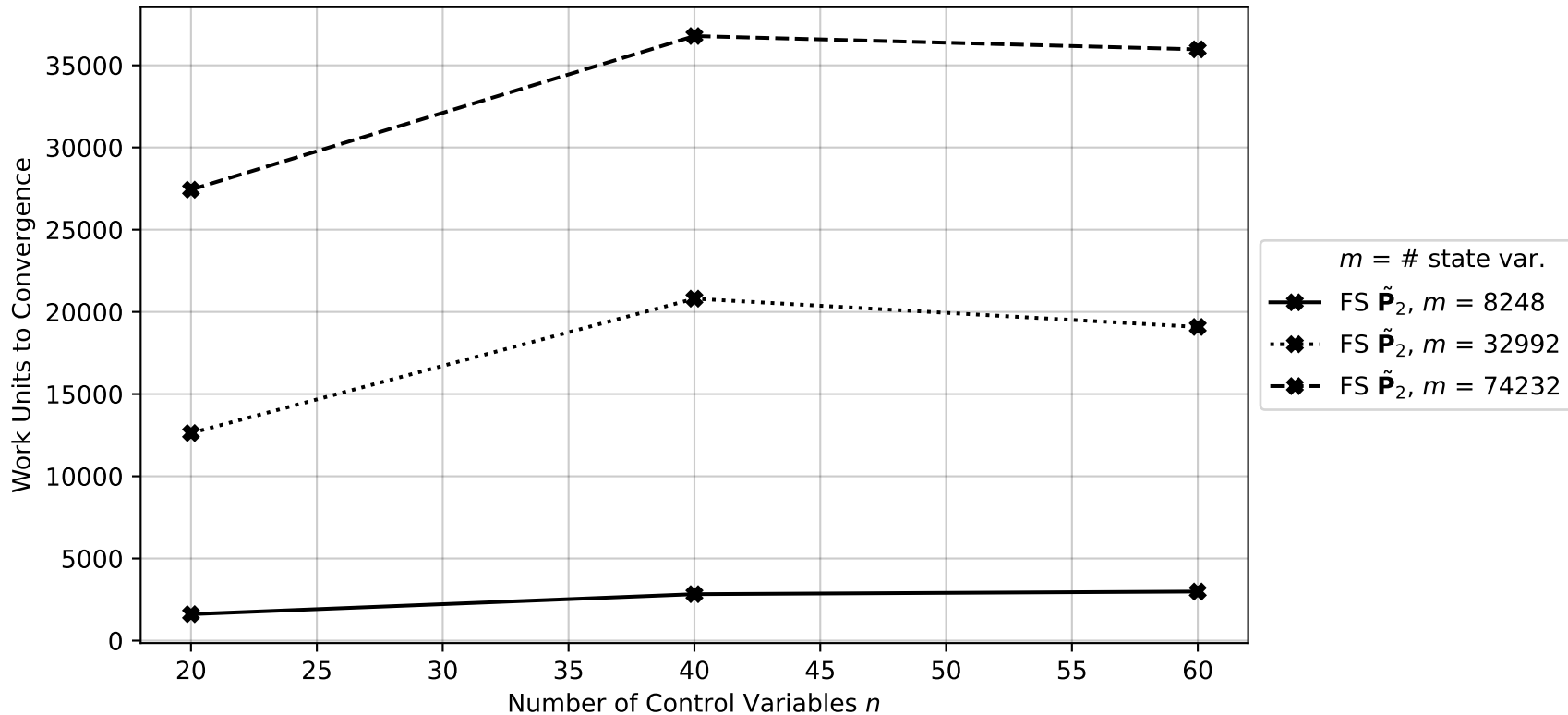
State Variables, $m = 74232$



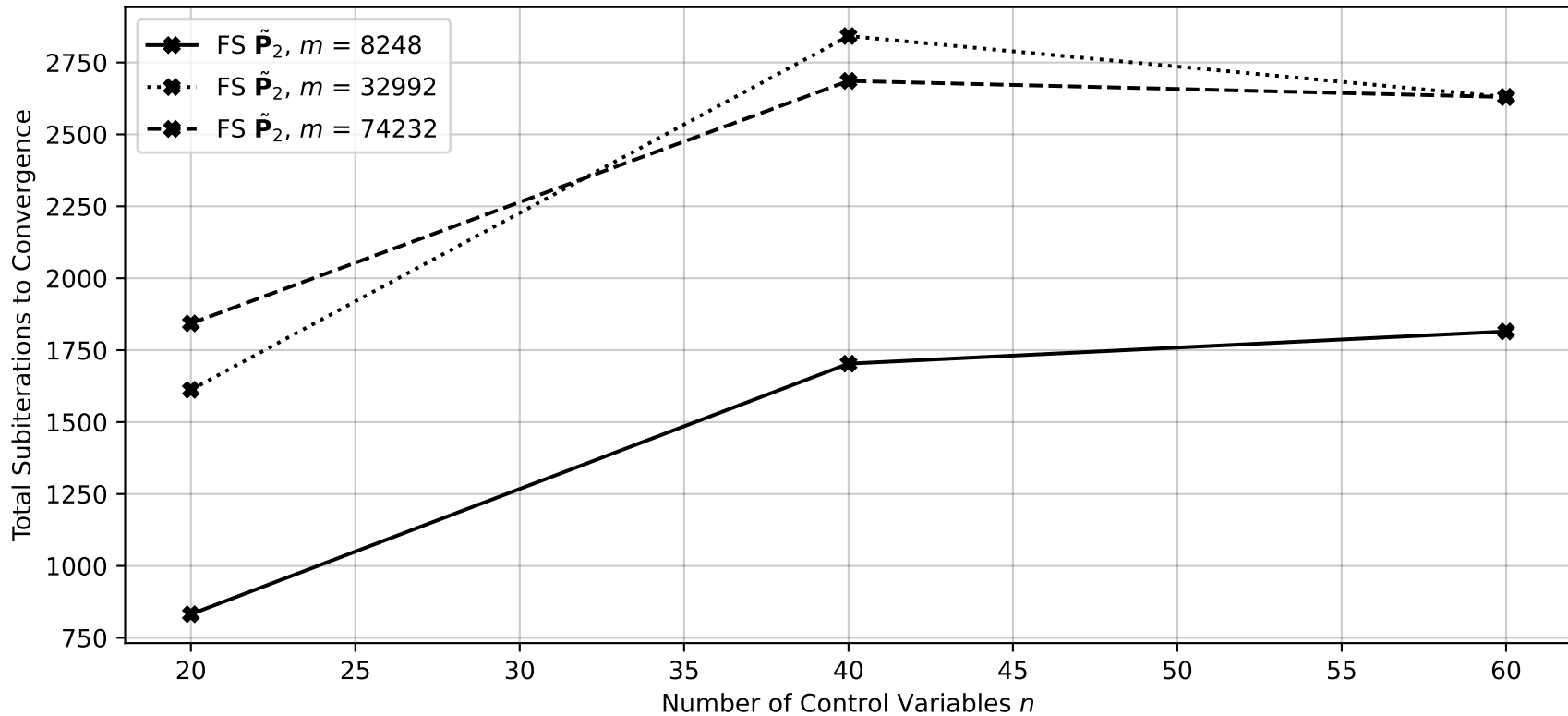
Full-space Design Cycles vs Control Variables



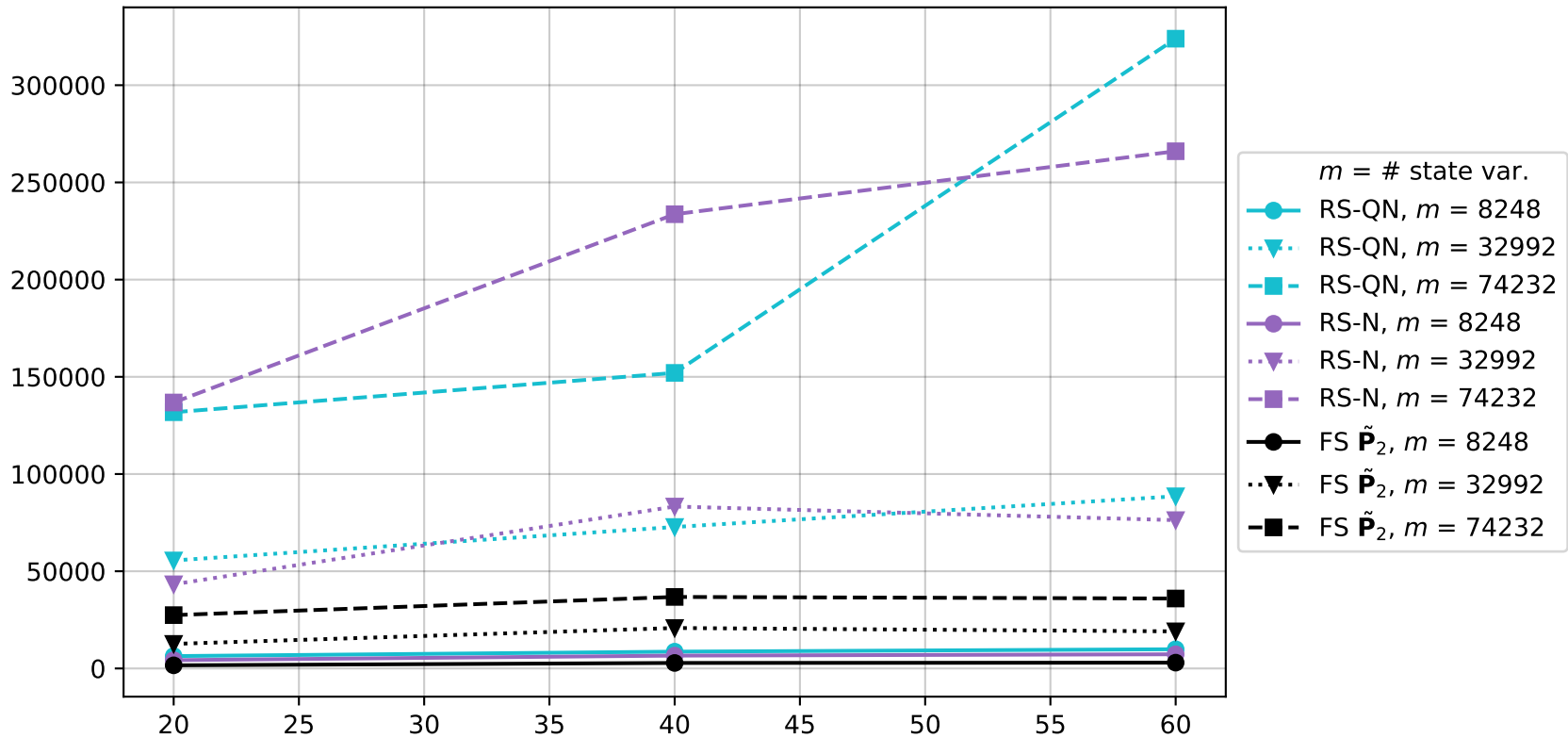
Work Units vs Control Variables



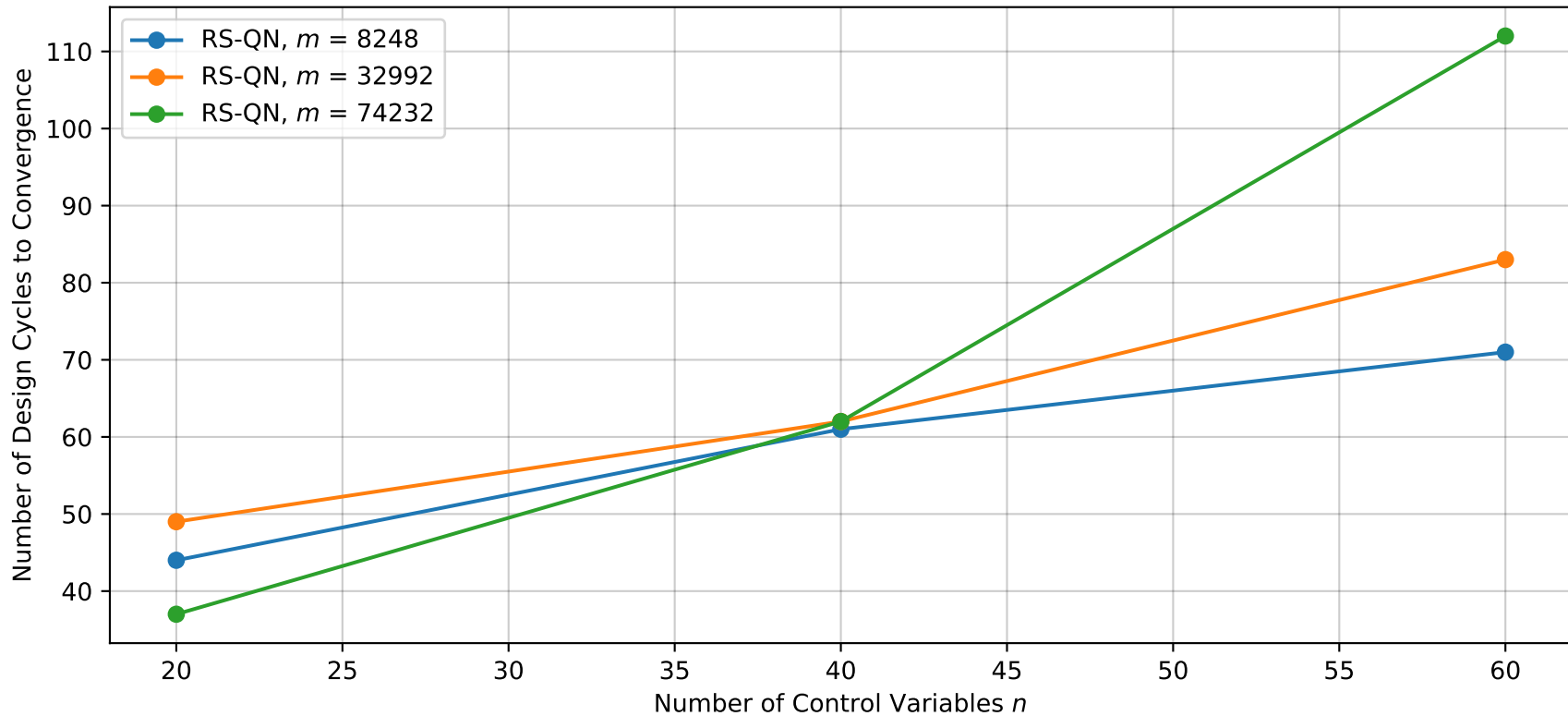
Total Subiterations vs Control Variables



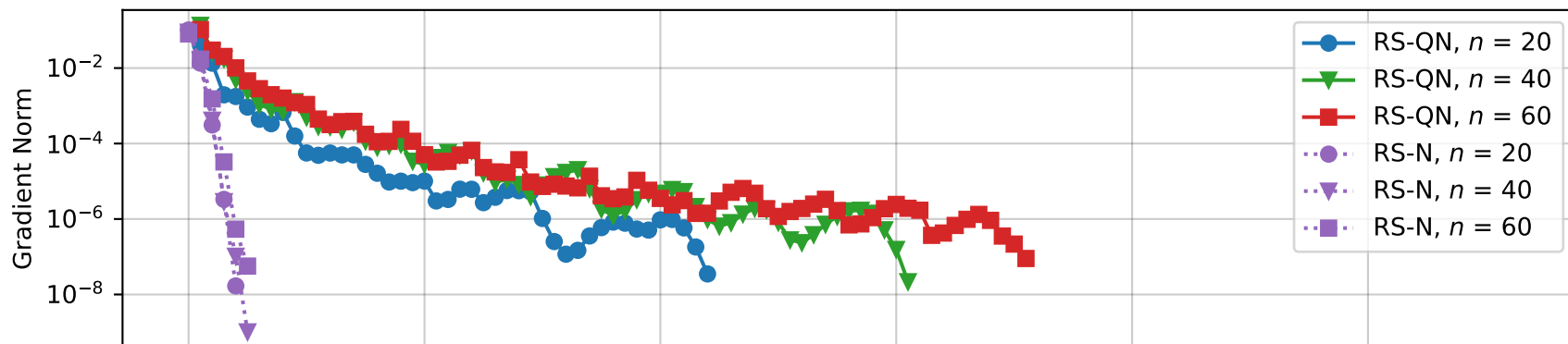
Work units to Convergence

Number of Control Variables n 

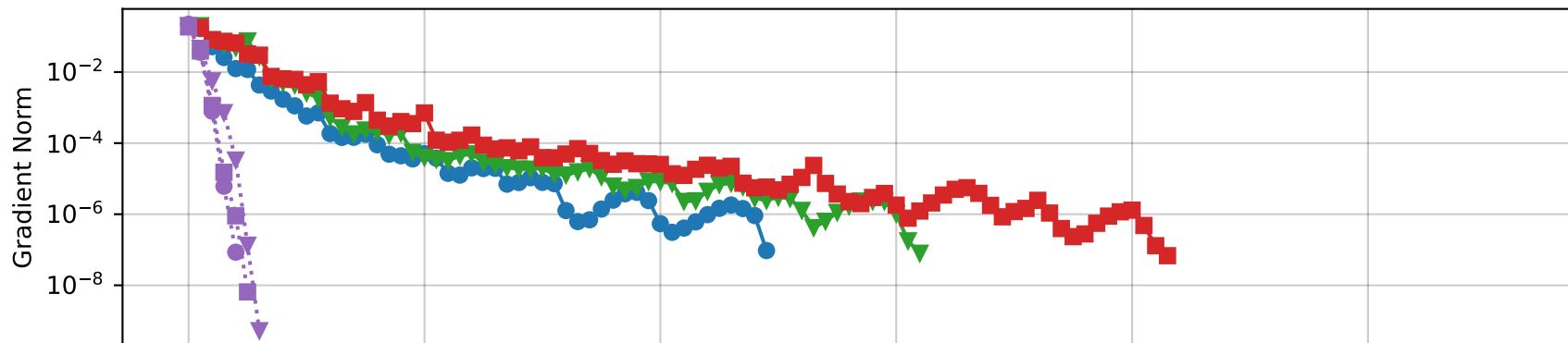
Reduced-space Design Cycles vs Control Variables



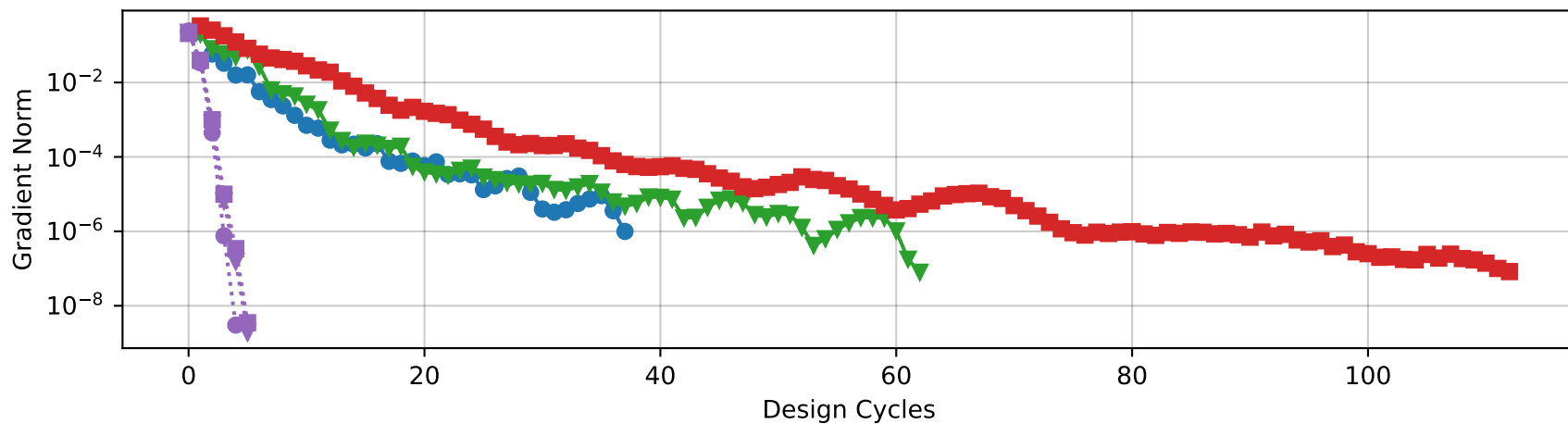
Reduced-space Gradient vs Design Cycles
State Variables, $m = 8248$

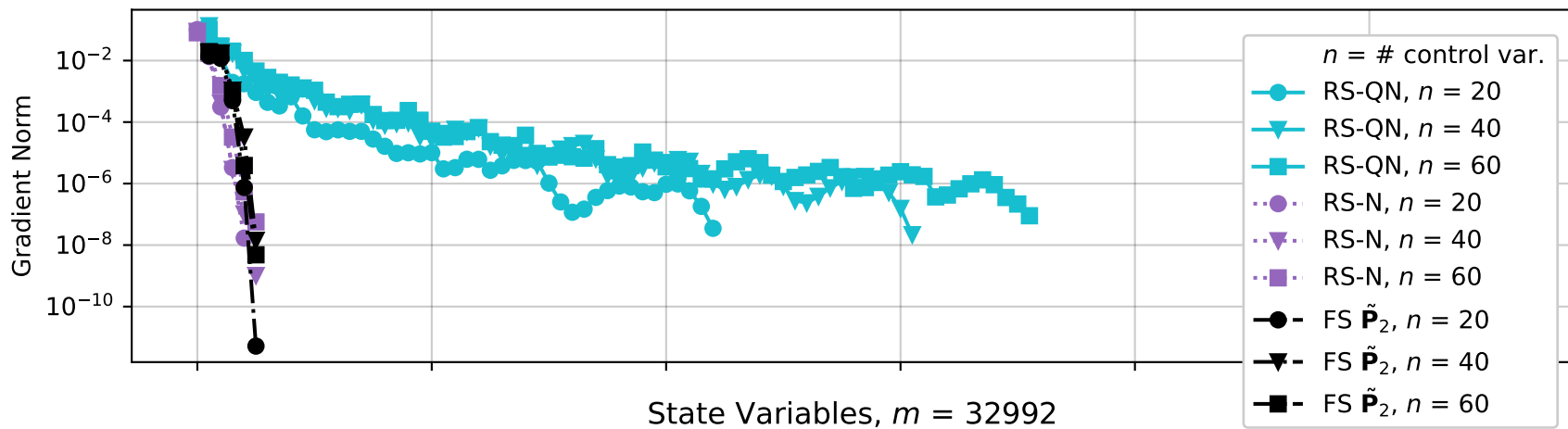
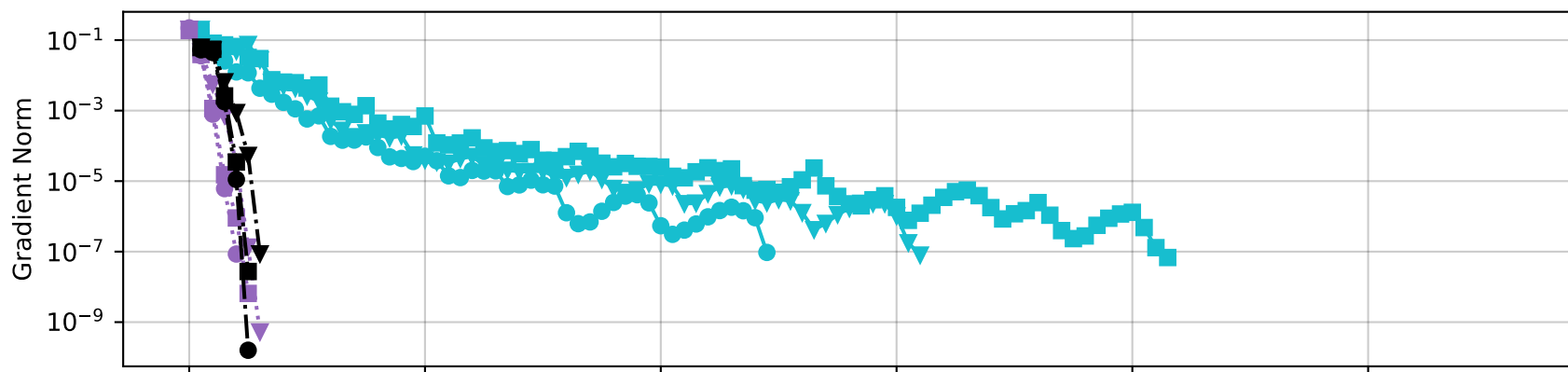
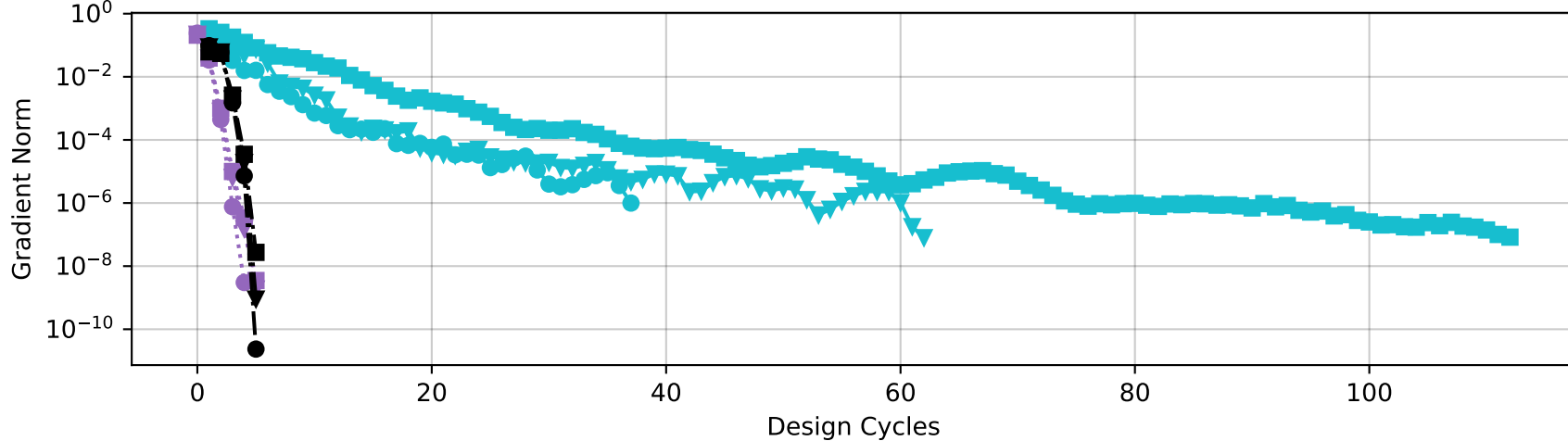


State Variables, $m = 32992$

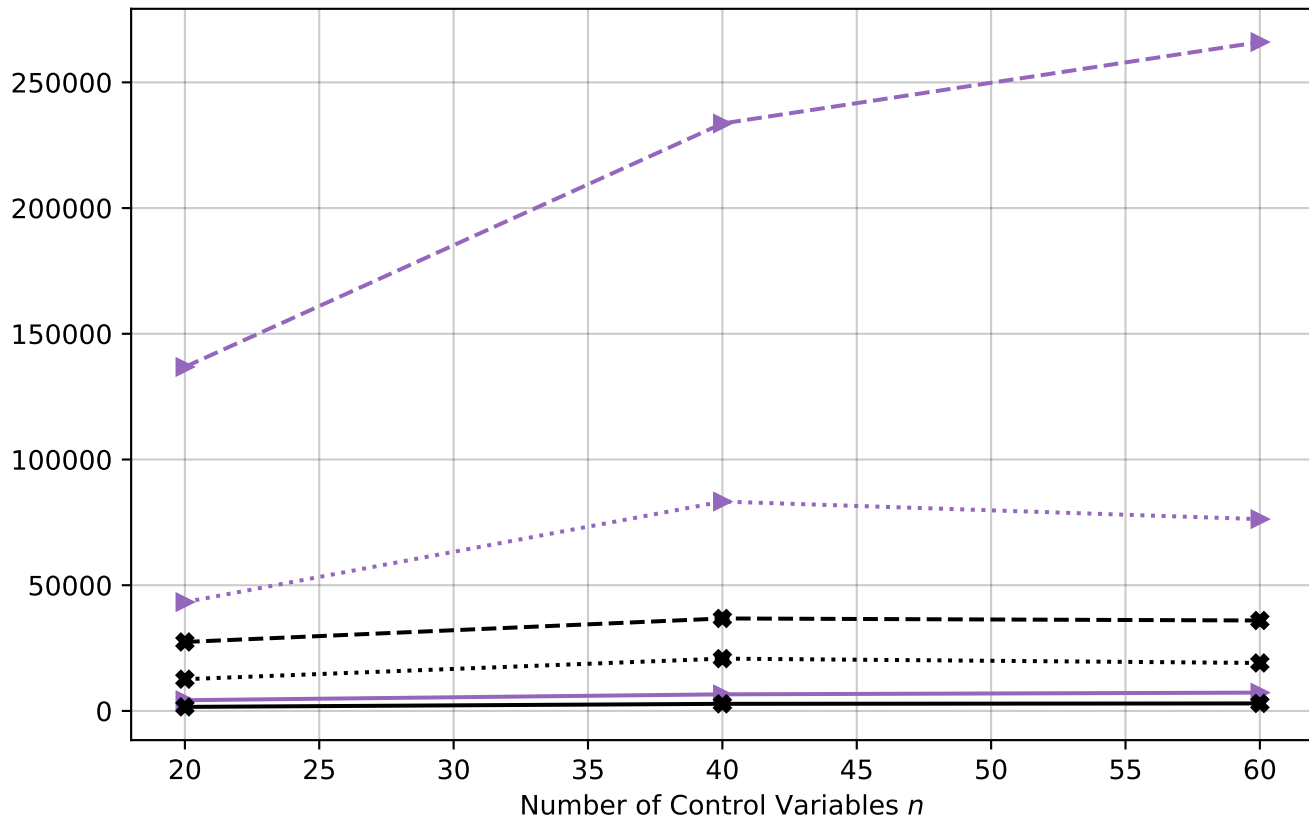


State Variables, $m = 74232$

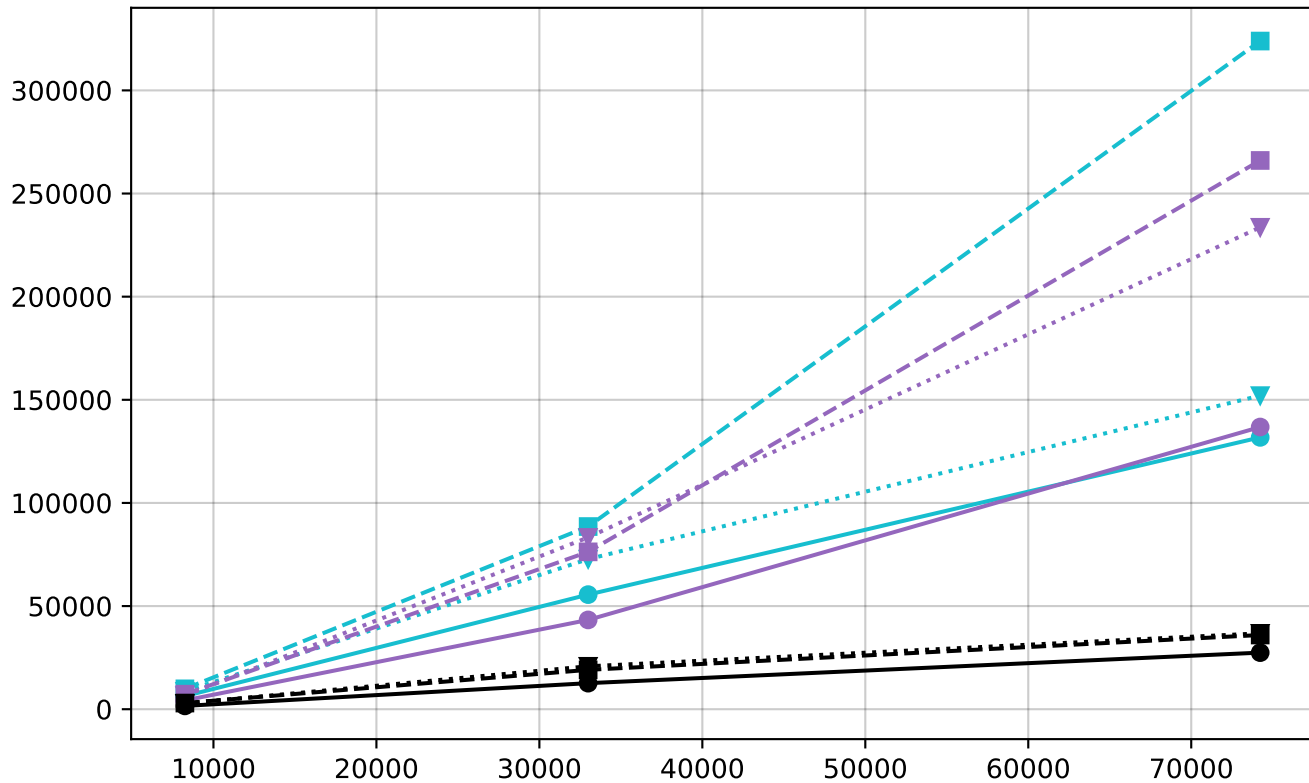


State Variables, $m = 8248$ State Variables, $m = 32992$ State Variables, $m = 74232$ 

Work Units to Convergence

 $m = \#$ state var.RS-N, $m = 8248$ RS-N, $m = 32992$ RS-N, $m = 74232$ FS $\tilde{\mathbf{P}}_2$, $m = 8248$ FS $\tilde{\mathbf{P}}_2$, $m = 32992$ FS $\tilde{\mathbf{P}}_2$, $m = 74232$

Work Units to Convergence

Number of State Variables m  $n = \#$ control var.RS-QN, $n = 20$ RS-QN, $n = 40$ RS-QN, $n = 60$ RS-N, $n = 20$ RS-N, $n = 40$ RS-N, $n = 60$ FS $\tilde{\mathbf{P}}_2$, $n = 20$ FS $\tilde{\mathbf{P}}_2$, $n = 40$ FS $\tilde{\mathbf{P}}_2$, $n = 60$

Gradient Norm vs Design Cycles $m = 32992$

