

Function: 0	Method: 1	Objective Val: 2.7456384089700976e-17	Iteration: 34	Computing Time: 0.0014	Termination: CONVERGED
Function: 0	Method: 2	Objective Val: 1.44899632457383e-17	Iteration: 40	Computing Time: 0.0015	Termination: CONVERGED
Function: 0	Method: 3	Objective Val: 2.1994622493950763e-22	Iteration: 22	Computing Time: 0.0012	Termination: CONVERGED
Function: 1	Method: 1	Objective Val: 2.5469418837918336e-14	Iteration: 44	Computing Time: 0.0099	Termination: CONVERGED
Function: 1	Method: 2	Objective Val: 3.893653717790981e-14	Iteration: 40	Computing Time: 0.0064	Termination: CONVERGED
Function: 1	Method: 3	Objective Val: 7.839305245633805e-30	Iteration: 30	Computing Time: 0.0167	Termination: CONVERGED
Function: 2	Method: 1	Objective Val: 3.986579112347309	Iteration: 85	Computing Time: 0.0152	Termination: CONVERGED
Function: 2	Method: 2	Objective Val: 1.886287755611688e-13	Iteration: 76	Computing Time: 0.0110	Termination: CONVERGED
Function: 2	Method: 3	Objective Val: 2.3141037439432076e-26	Iteration: 17	Computing Time: 0.0119	Termination: CONVERGED
Function: 3	Method: 1	Objective Val: 2.7941023166915795e-12	Iteration: 205	Computing Time: 0.6261	Termination: CONVERGED
Function: 3	Method: 2	Objective Val: 1.559060185969266e-11	Iteration: 53	Computing Time: 0.0616	Termination: CONVERGED
Function: 3	Method: 3	Objective Val: 4.387633427883135e-23	Iteration: 163	Computing Time: 1.4795	Termination: CONVERGED
Function: 4	Method: 1	Objective Val: 1.612579264698055e-12	Iteration: 433	Computing Time: 0.8871	Termination: CONVERGED
Function: 4	Method: 2	Objective Val: 1.8301059876456115e-12	Iteration: 518	Computing Time: 0.5815	Termination: CONVERGED
Function: 4	Method: 3	Objective Val: 2.134731331325873e-20	Iteration: 19	Computing Time: 0.1767	Termination: CONVERGED
Function: 5	Method: 1	Objective Val: 3.9866238543186774	Iteration: 4651	Computing Time: 193.2192	Termination: CONVERGED
Function: 5	Method: 2	Objective Val: 4.4385754046503415e-11	Iteration: 5017	Computing Time: 57.0230	Termination: CONVERGED
Function: 5	Method: 3	Objective Val: 1.5484470321191808e-22	Iteration: 16	Computing Time: 1.5905	Termination: CONVERGED
Function: 6	Method: 1	Objective Val: 8374.656350398876	Iteration: 6000	Computing Time: 1755.9055	Termination: MAX ITERATIONS
Function: 6	Method: 2	Objective Val: 8712.317395835673	Iteration: 6000	Computing Time: 1260.4598	Termination: MAX ITERATIONS
Function: 6	Method: 3	Objective Val: 2.268167457613981e-23	Iteration: 16	Computing Time: 96.4351	Termination: CONVERGED
Function: 7	Method: 1	Objective Val: 6.087296225067223e-18	Iteration: 15	Computing Time: 0.0011	Termination: CONVERGED
Function: 7	Method: 2	Objective Val: 6.035858733958949e-14	Iteration: 17	Computing Time: 0.0009	Termination: CONVERGED
Function: 7	Method: 3	Objective Val: 4.257728829441063e-23	Iteration: 8	Computing Time: 0.0029	Termination: CONVERGED
Function: 8	Method: 1	Objective Val: 1.4622702031282866e-16	Iteration: 16	Computing Time: 0.0010	Termination: CONVERGED
Function: 8	Method: 2	Objective Val: 1.4999056883392474e-16	Iteration: 11	Computing Time: 0.0007	Termination: CONVERGED
Function: 8	Method: 3	Objective Val: 1.3160550898750807e-18	Iteration: 7	Computing Time: 0.0006	Termination: CONVERGED
Function: 9	Method: 1	Objective Val: 1.0391216688062855e-09	Iteration: 97	Computing Time: 0.0065	Termination: CONVERGED
Function: 9	Method: 2	Objective Val: 7.781903165633637e-10	Iteration: 155	Computing Time: 0.0122	Termination: CONVERGED
Function: 9	Method: 3	Objective Val: 3.188865475915145e-10	Iteration: 21	Computing Time: 0.0109	Termination: CONVERGED

DISCUSSION: I think most if not all of the results corresponded to what we learned about regarding the theory. It was interesting seeing how using Newton CG drastically cut down on some functions, like 5, 6, 7 and caused others to converge much more slowly, like question 10. The limited memory variant of BFGS was the most interesting function to observe, considering we cut down on the amount of storage from what we were using in BFGS. It was cool to see that the method was still very effective and comparable to regular BFGS.