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Homework 3 – Report

Results:

* L2 error of closed-form solution: 17.996134
* L2 error of gradient descent with learning rate of 10.^(-6): 161.129851
* L2 error of gradient descent with learning rate of 10.^(-5): 160.985509
* L2 error of gradient descent with learning rate of 10.^(-4): 159.549280
* L2 error of gradient descent with learning rate of 10.^(-3): 145.882988
* L2 error of gradient descent with learning rate of 10.^(-2): 60.691469
* L2 error of gradient descent with learning rate of 10.^(-1): 17.986144
* My L2 error of gradient descent with a learning rate exponent of -1 is consistently within 0.11 of the L2 error of the closed form solution with 50 iterations
* A larger learning rate/steps seems to converge faster than the smaller learning rates/steps
* Increasing the number of iterations brings more of the smaller learning rates to convergence: 1000 iterations = -2 exponent converges, 10000 iterations = -3 exponent converges, 100000 iterations = -4 exponent converges, etc.