Akshata Patil

Date of Submission: 04/14/2023

Project # 1:

The Nesterov Momentum method is an extension of the standard gradient descent algorithm and uses a momentum term to speed up the convergence. This method was chosen as it calculates the gradient of the loss function with respect to the model parameters, adjusts the gradient by considering the momentum from the previous iteration, and then updates the model parameters based on the adjusted gradient.
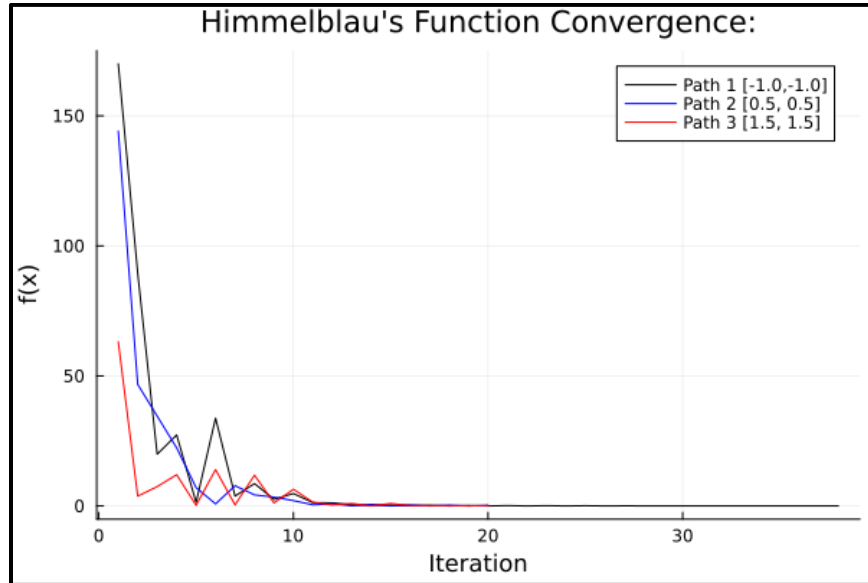
1) **Rosenbrock Function:**
   Simple 1 was optimized using the Nesterov Momentum listed in the textbook. For optimization process, the method was fueled by a decaying momentum factor of 0.5 and an initial learning rate of 0.9. The contour and convergence plots have been attached below:
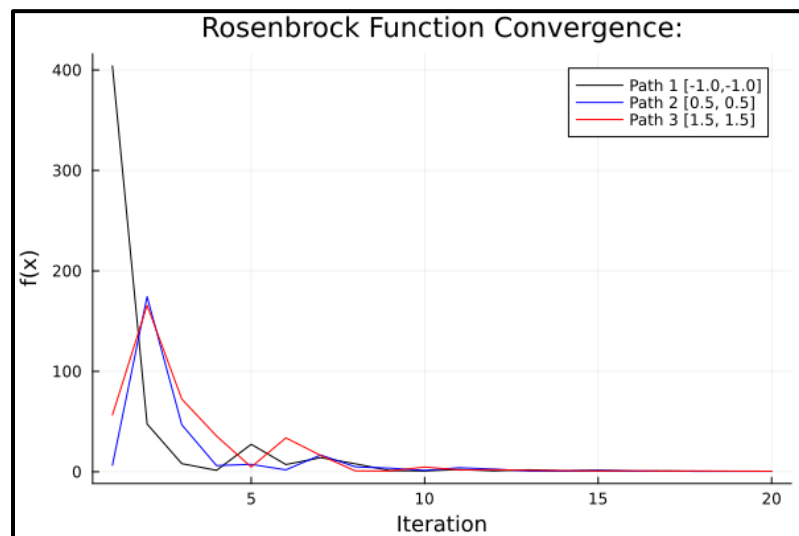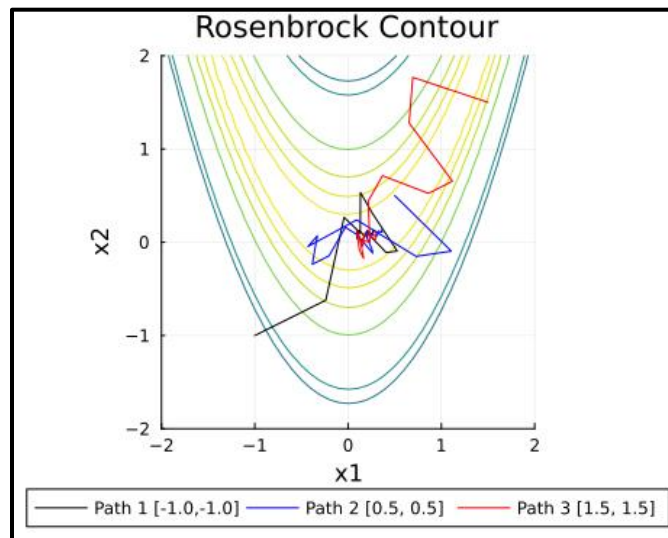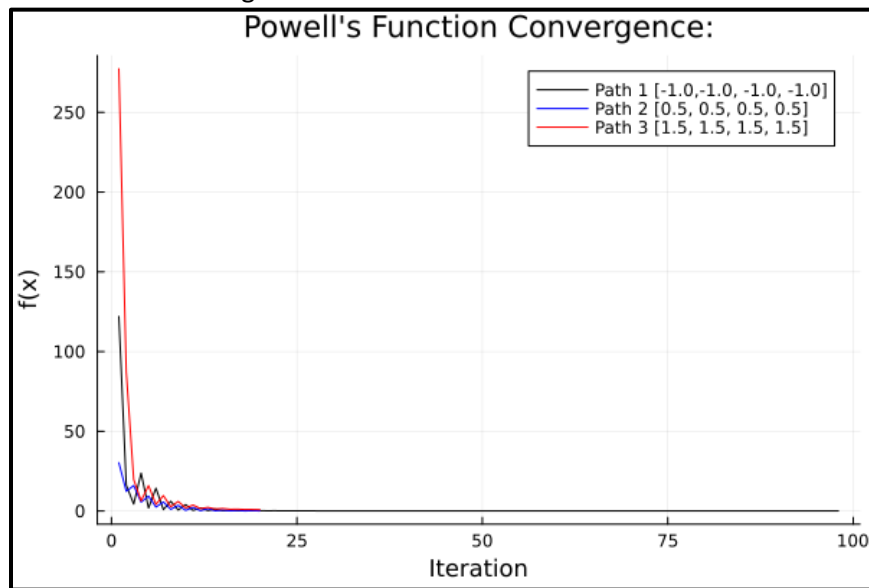
2) Himmelblau's Function:

Simple 2 was optimized using the Nesterov Momentum listed in the textbook. For optimization process, the method was fueled by tuning a decaying momentum factor of 0.5 and an initial learning rate of 2.

3) **Powell's Function:**

Powell's function was also optimized using the Nesterov Momentum method as listed in the textbook. For optimization process, the method was fueled by tuning a decaying momentum factor of 0 and an initial learning rate of 2.

4) **Secret 1 and 2:**

Secret functions were also optimized using the Nesterov Momentum method as listed in the textbook. For optimization process, the method was fueled by tuning a decaying momentum factor of 0.1, 0.6 and an initial learning rate of 1, 1 respectively.