Stochastic Optimization Algorithms

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Problem 1.1

1. Initially the function is defined as follows:

1. Now the gradient of the above function is calculated for the given conditions.
2. when the constraints are fulfilled:

1. when the constraints are not fulfilled:

1. For unconstrained condition (), the minimum is found as

The minimum points are

5. The Penalty method is carried out to find the minimum points with the following parameters:

Step size,

Table 1: Minimum points for various penalty values

|  |  |  |
| --- | --- | --- |
|  |  |  |
| 1 | 0.433777 | 1.210166 |
| 10 | 0.331354 | 0.995540 |
| 100 | 0.313738 | 0.955252 |
| 1000 | 0.311790 | 0.950732 |