Optimisation scenarios
Graded Quiz • 20 min

Congratulations! You passed!

Grade received 100%

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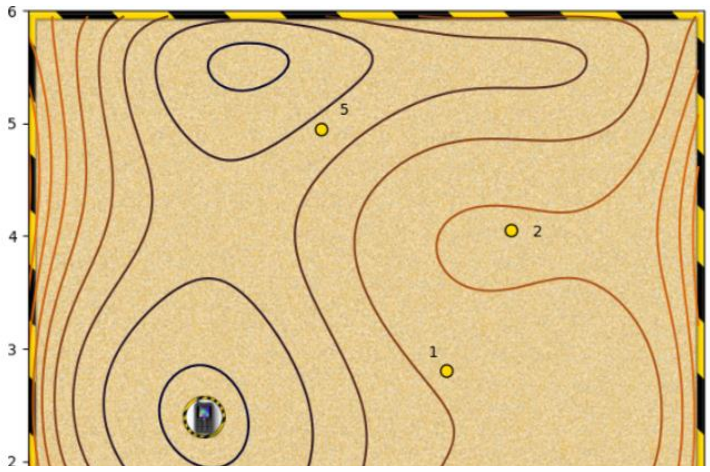
1. Given the following contour plot,

1 / 1 point



Which starting points (from 1 to 5) are likely to converge to the global minimum (shown by the mobile phone) when using a steepest descent algorithm?

- [x] Starting point 1

Correct
In this case, the algorithm descends smoothly down the slope.

- [ ] Starting point 2
- [x] Starting point 3

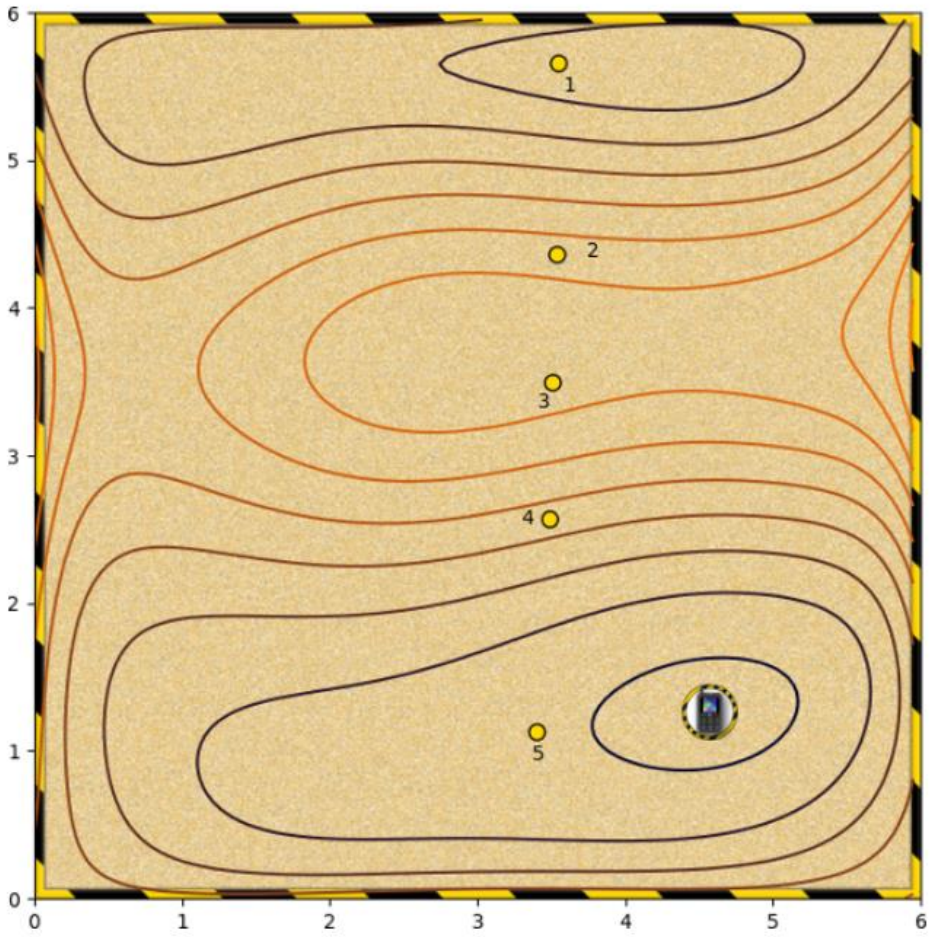
Correct
In this case, the algorithm descends smoothly down the slope.

- [x] Starting point 4

Correct
In this case, the algorithm descends smoothly down the slope.

- [ ] Starting point 5
- [ ] None of the above

2. Again, which starting points converge to the global minimum?



- [ ] Starting point 2
- [x] Starting point 3

Correct
This should converge to the global minimum.

- [x] Starting point 4

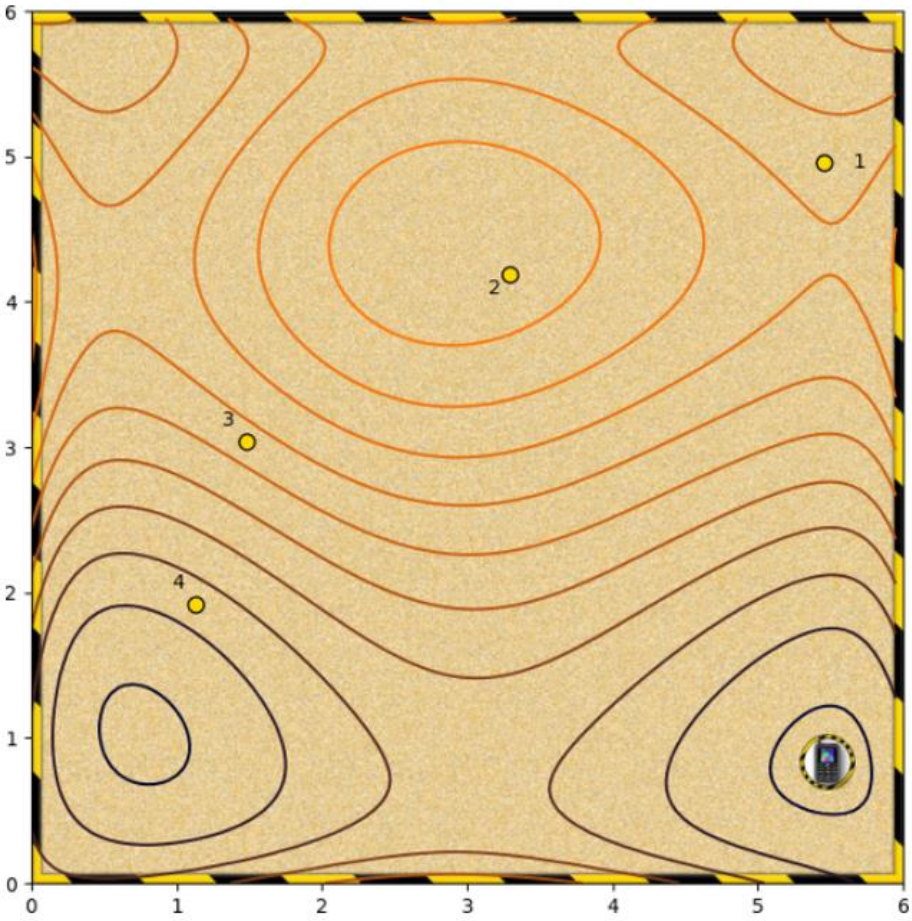
Correct
This should converge to the global minimum.

- [x] Starting point 5

Correct
This should converge to the global minimum.

- [ ] None of the above

3. Which starting points converge to the global minimum?

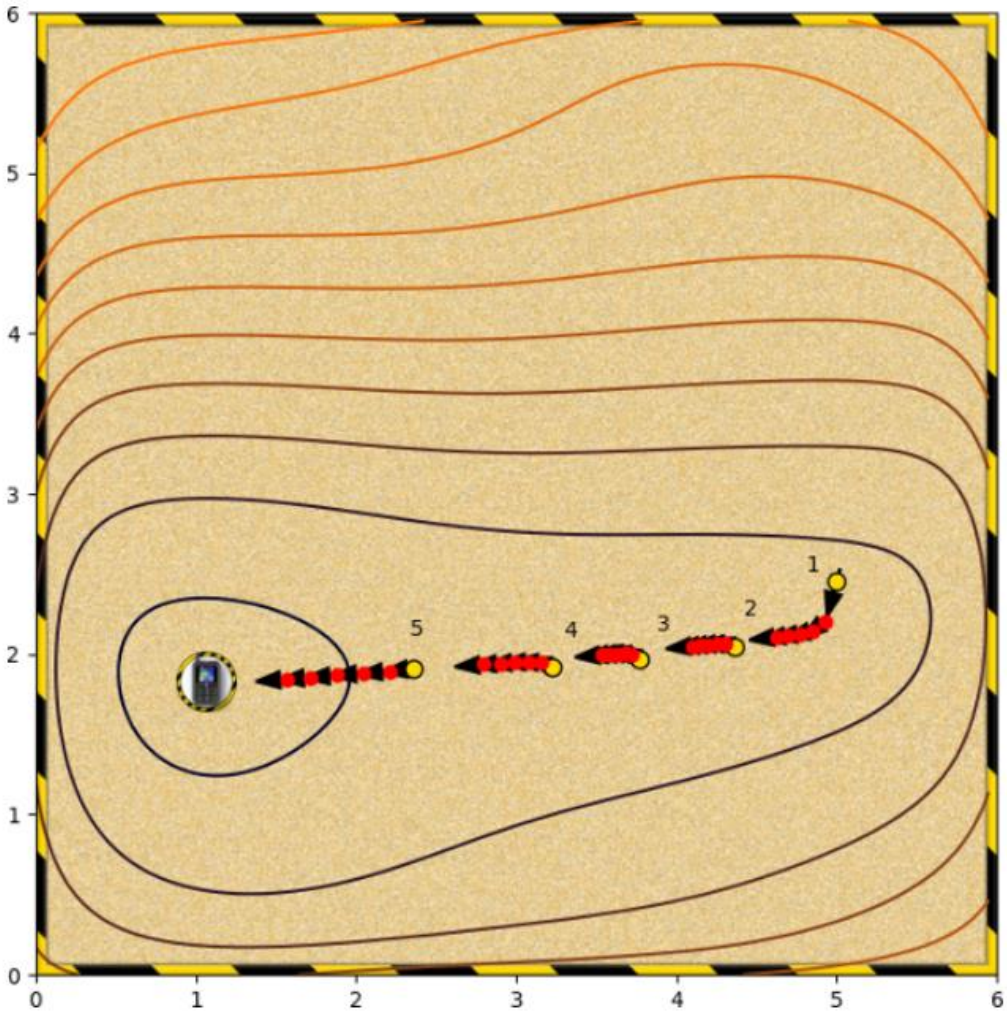


- [ ] Starting point 1
- [x] Starting point 2

Correct
From here, the algorithm will descend the hill to the global minimum.

- [ ] Starting point 3
- [ ] Starting point 4
- [ ] None of the above

4. What's happening in this gradient descent?

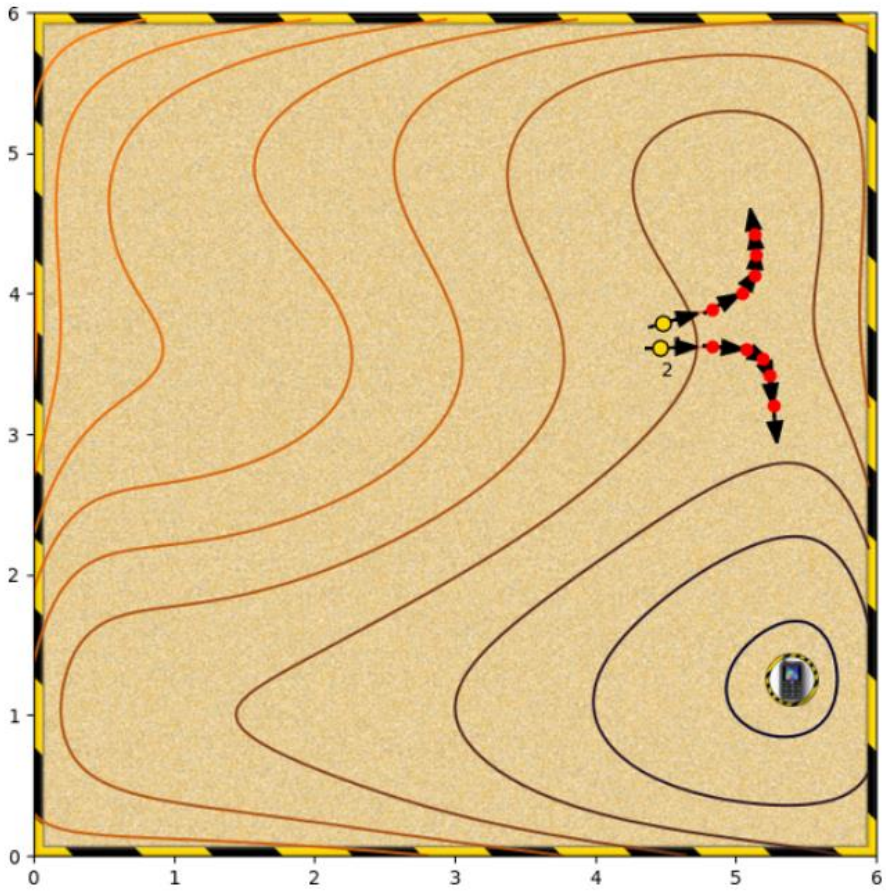


- (●) The global minimum is in a wide and flat basin, so convergence is slow.
- ( ) The algorithm is getting stuck near local minima.
- ( ) None of the other options.
- ( ) The algorithm is getting stuck near saddle points.

Correct

This could be improved by increasing the aggression.

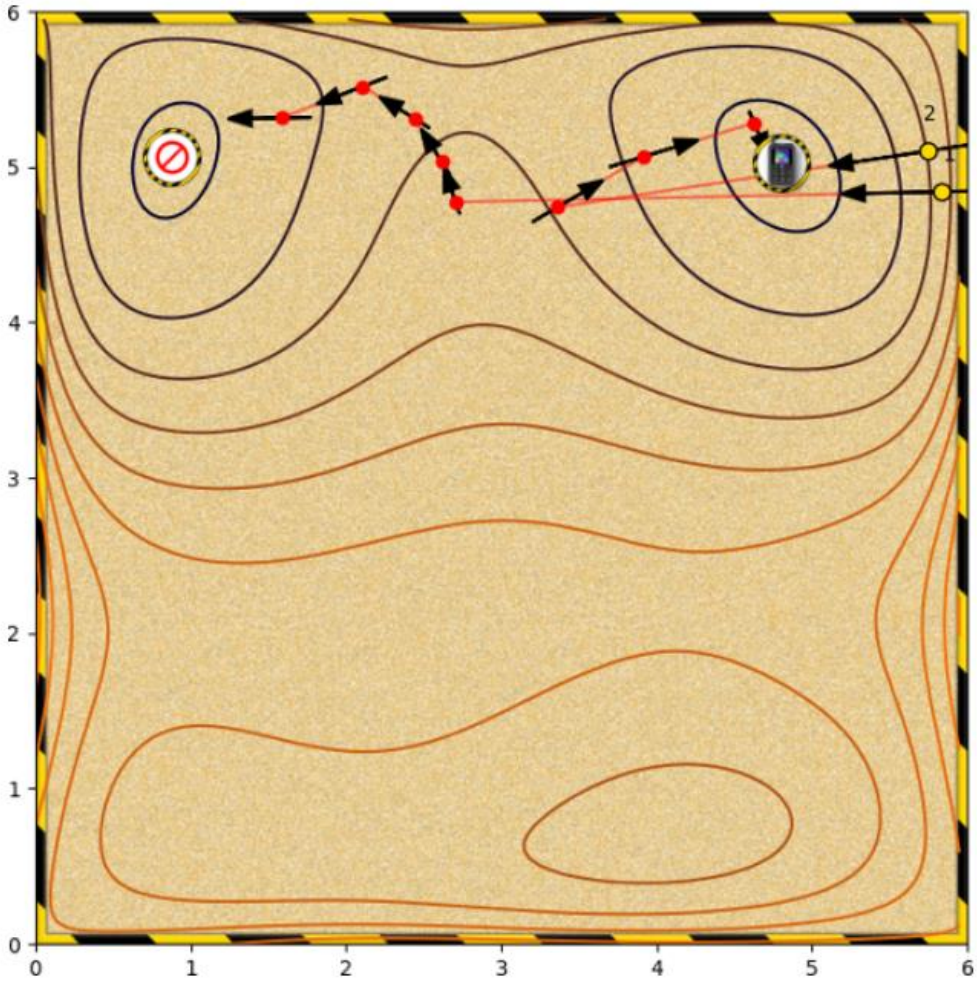
5. What is happening here?



- ○ None of the other options.
- ○ There is noise in the system.
- ○ The algorithm is passing either side of a local minimum.
- ○ The algorithm is passing either side of a local maximum.
- ◉ The algorithm is passing either side of a saddle point.

✓ **Correct**

6. What is happening here?



- ○ None of the other options.
- ○ The marked points are saddle points.
- ◉ The Jacobian at the starting point is very large.
- ○ There is noise in the system

Correct

This is causing the algorithm to overshoot. In one case into a different basin.