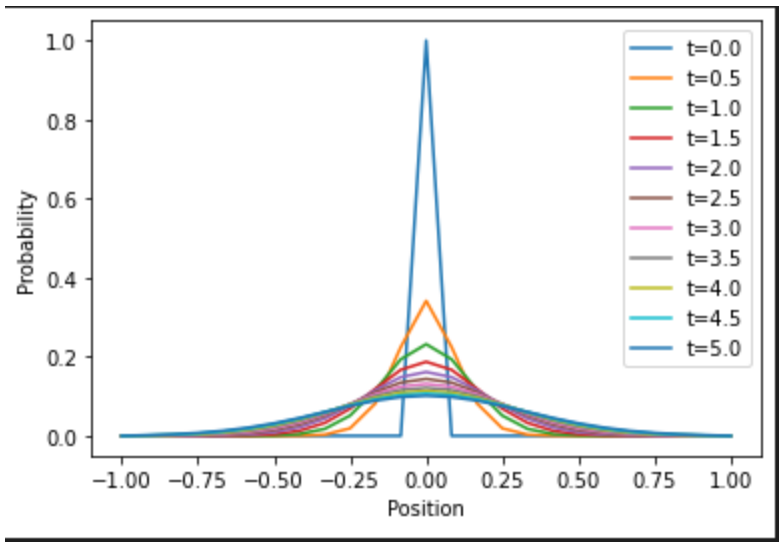
Report - 4

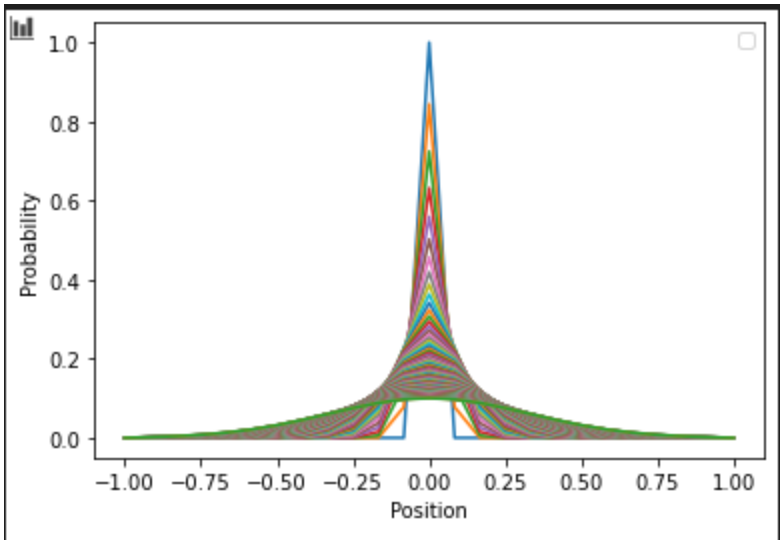
1-Dimensional

After converting the differential equation into a recursion,

$prob[t+1][pos] = prob[t][pos] + D\frac{dt}{dx^2}(prob[t][pos+1] + prob[t][pos-1] - 2prob[t][pos])$



Probability density plot for every tenth time step



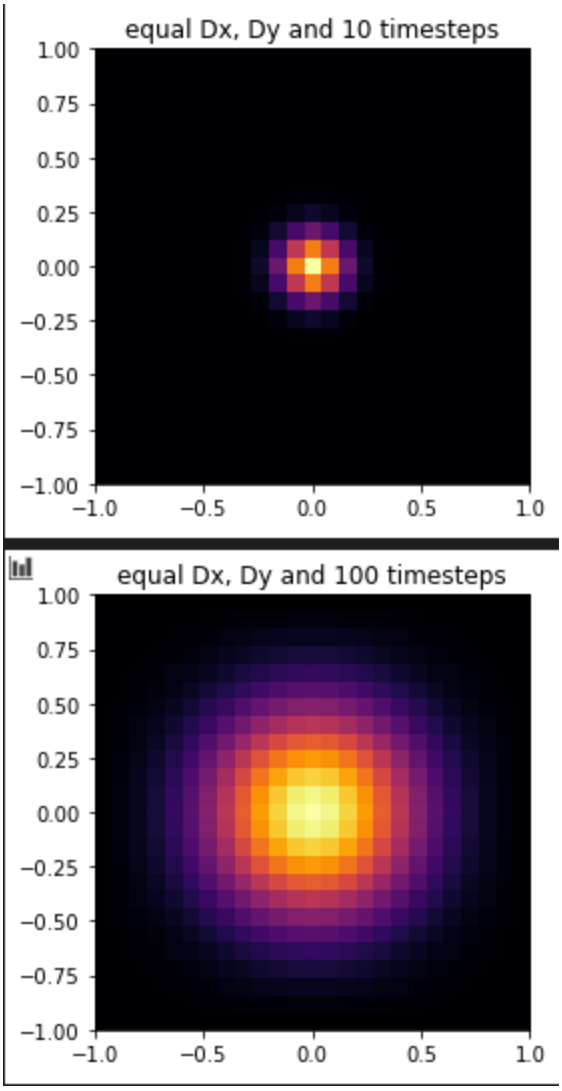
Probability density plot for every time step

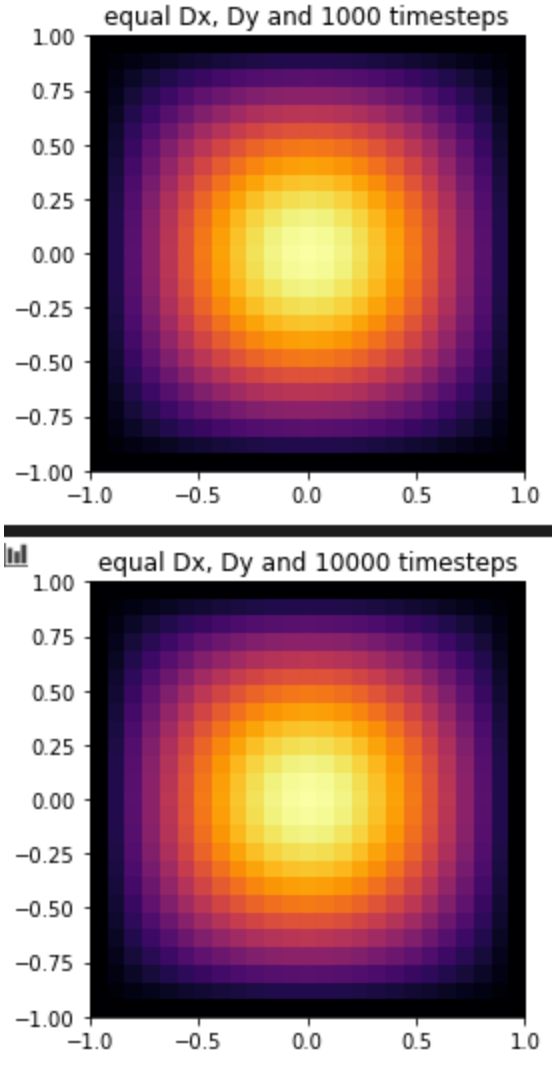
2-Dimensional

After converting the differential equation into a recursion

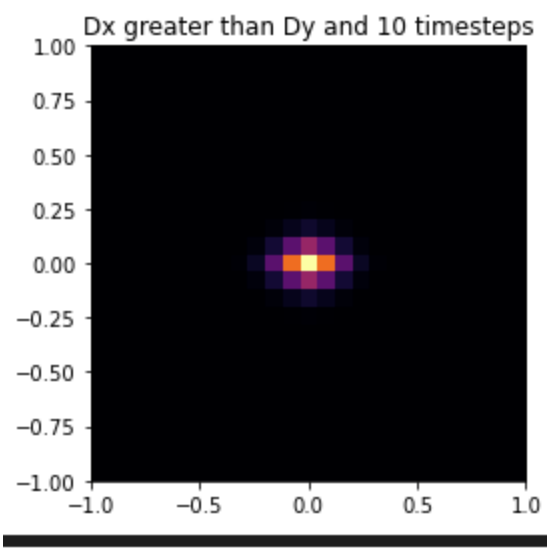
$prob[t+1][y][x] = prob[t][y][x] + D_x \frac{dt}{dx^2}(prob[t][y][x+1] + prob[t][y][x-1] - 2prob[t][y][x]) + D_y \frac{dt}{dy^2}(prob[t][y+1][x] + prob[t][y-1][x] - 2prob[t][y][x])$

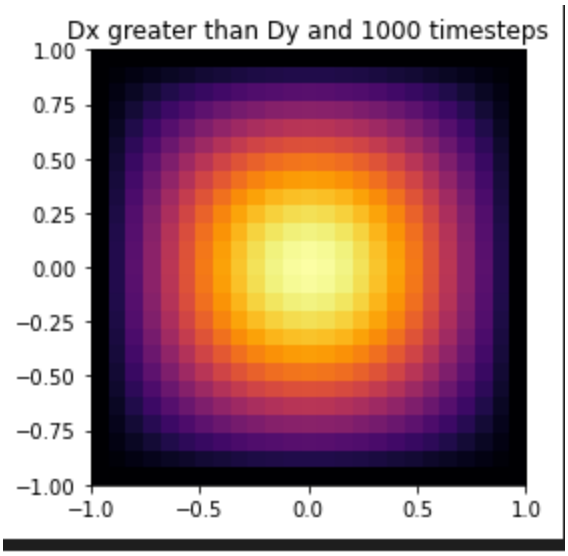
dx = dy

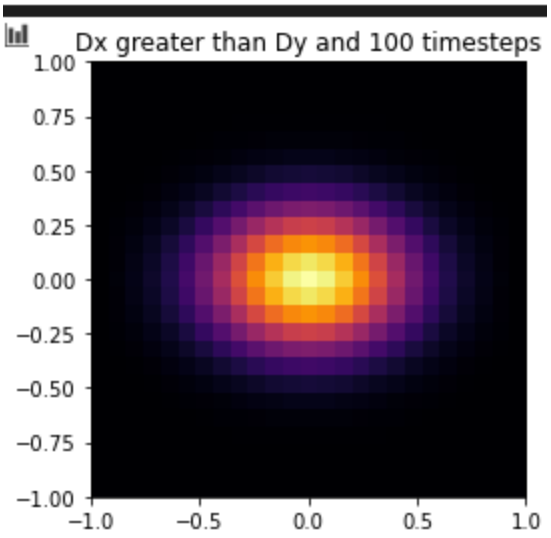


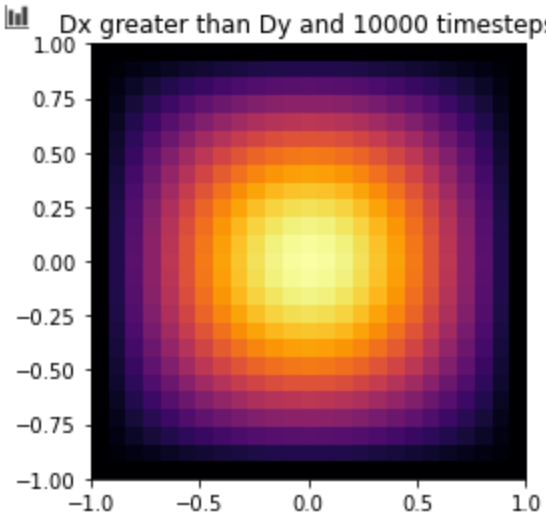


dx > dy

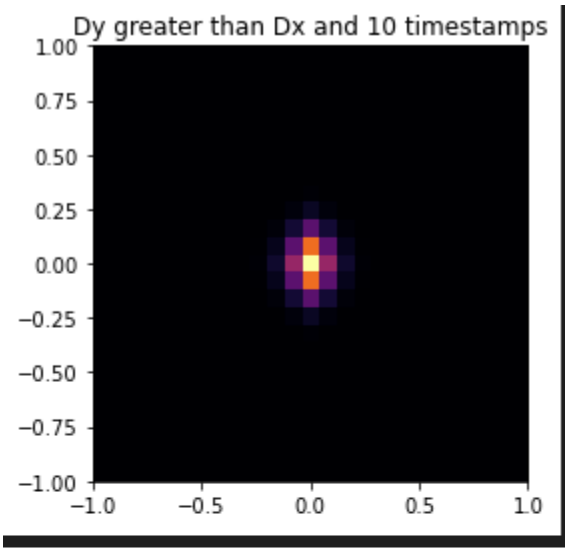

Dx greater than Dy and 10 timesteps
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
−1.0
−0.5
0.0
0.5
1.0

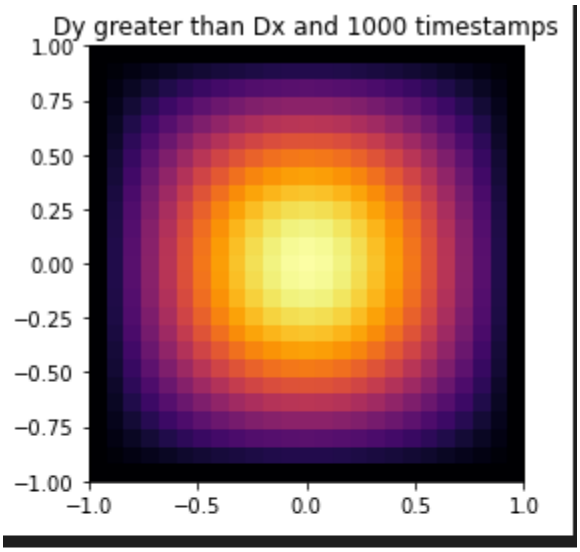

Dx greater than Dy and 1000 timesteps
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
−1.0
−0.5
0.0
0.5
1.0

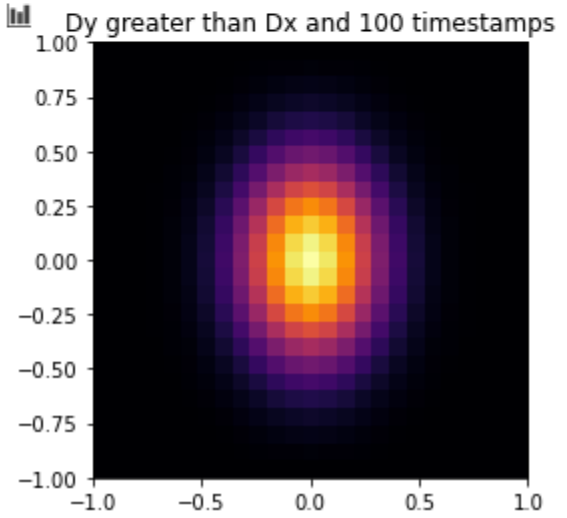

Dx greater than Dy and 100 timesteps
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
−1.0
−0.5
0.0
0.5
1.0

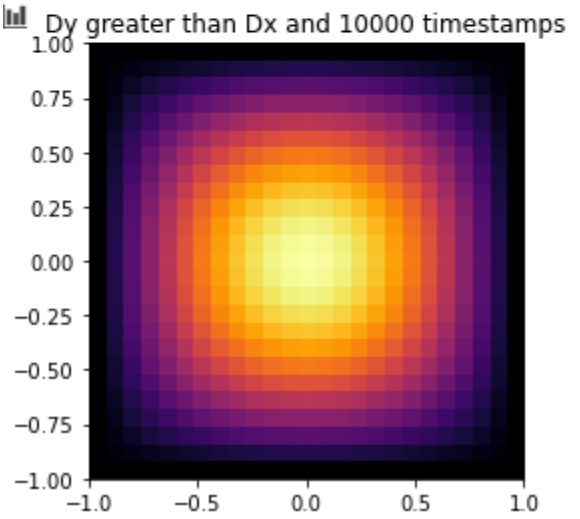

Dx greater than Dy and 10000 timesteps
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
−1.0
−0.5
0.0
0.5
1.0

dx < dy


Dy greater than Dx and 10 timestamps
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
−1.0
−0.5
0.0
0.5
1.0


Dy greater than Dx and 1000 timestamps
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
−1.0
−0.5
0.0
0.5
1.0


Dy greater than Dx and 100 timestamps
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
−1.0
−0.5
0.0
0.5
1.0


Dy greater than Dx and 10000 timestamps
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
−1.0
−0.5
0.0
0.5
1.0