

# Maths for ML II

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Nipun Batra

January 8, 2021

IIT Gandhinagar

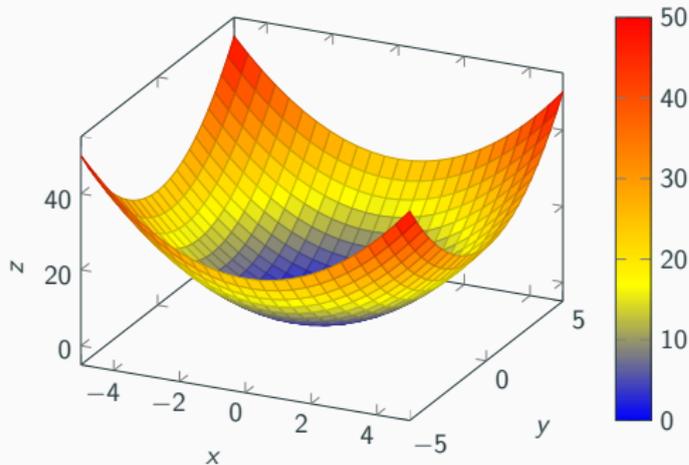
## Contour Plot

$$z = f(x, y) = x^2 + y^2$$

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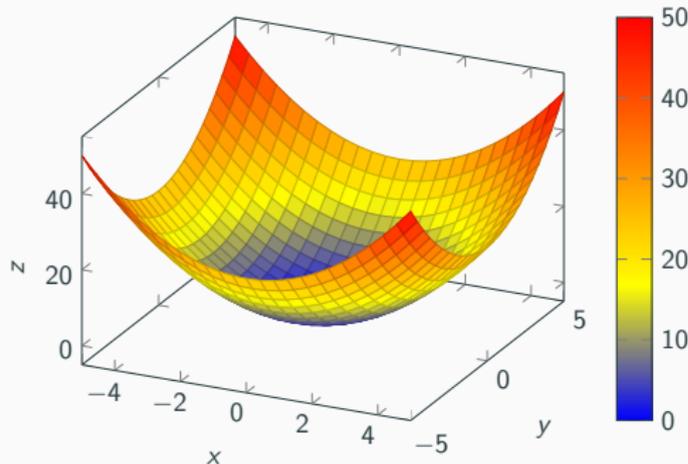
Surface Plot



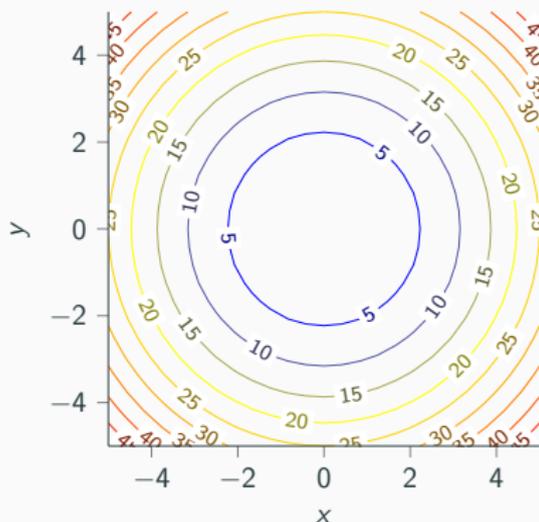
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$$z = f(x, y) = x^2 + y^2$$

Surface Plot



Contour plot, view from top



Then plot  $f(x, y) = K$  for varying K.

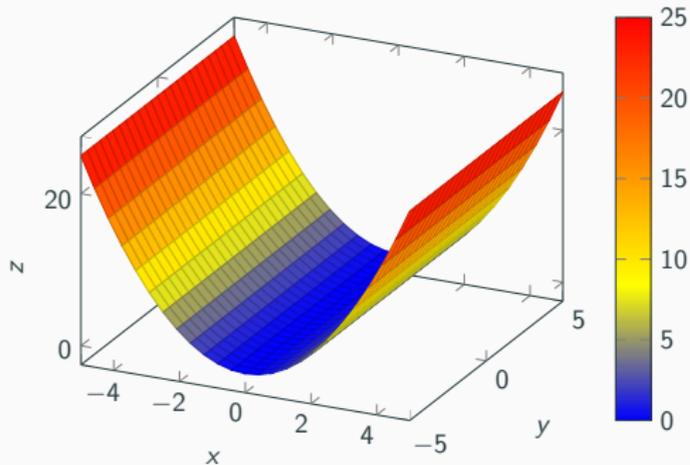
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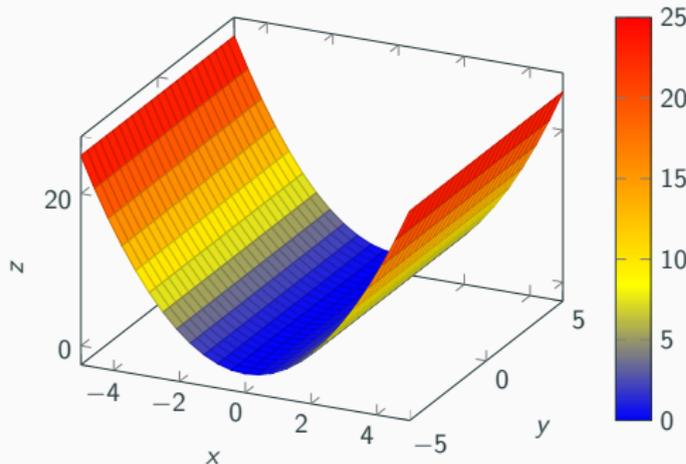
Surface Plot



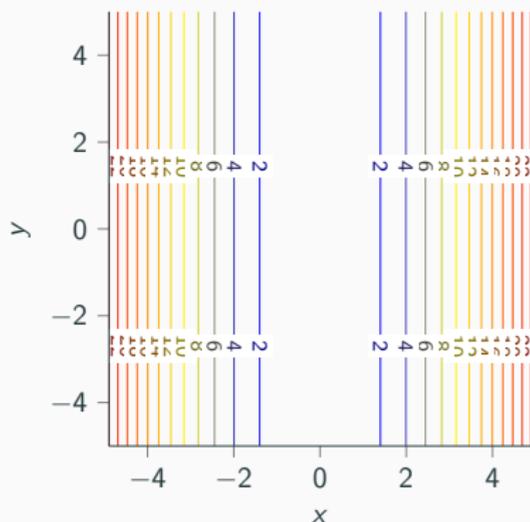
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Surface Plot



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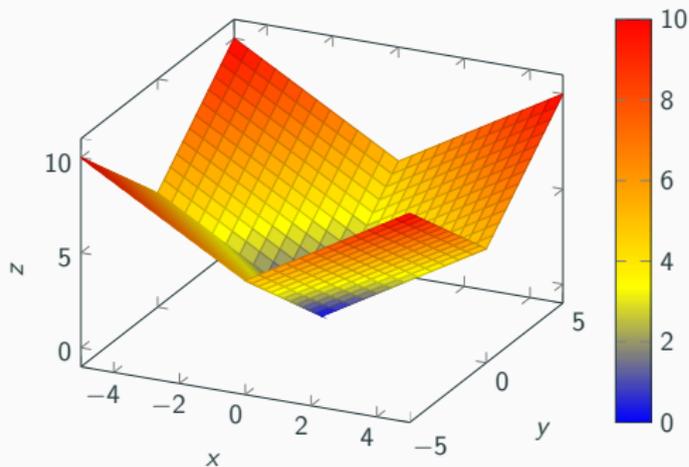
## Contour Plot

$$z = f(x, y) = |x| + |y|$$

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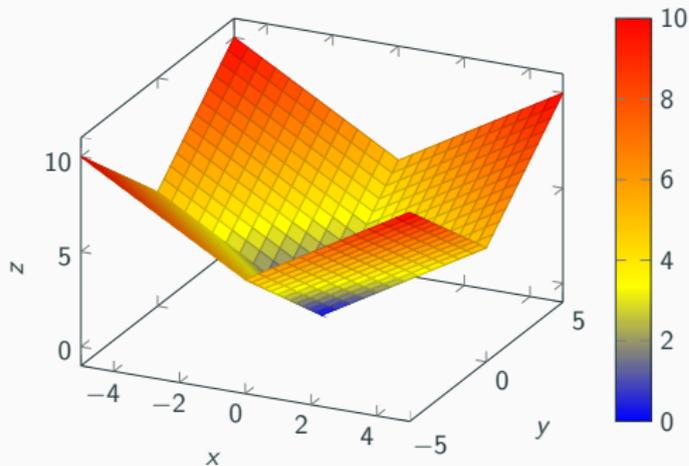
Surface Plot



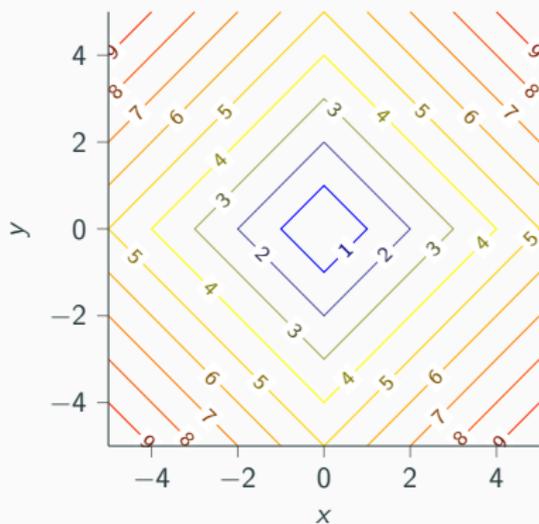
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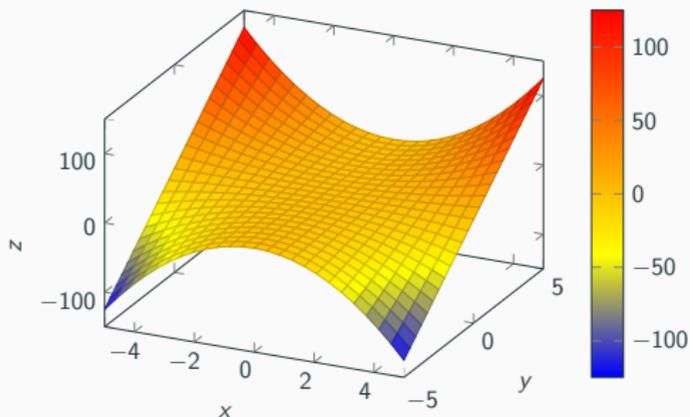
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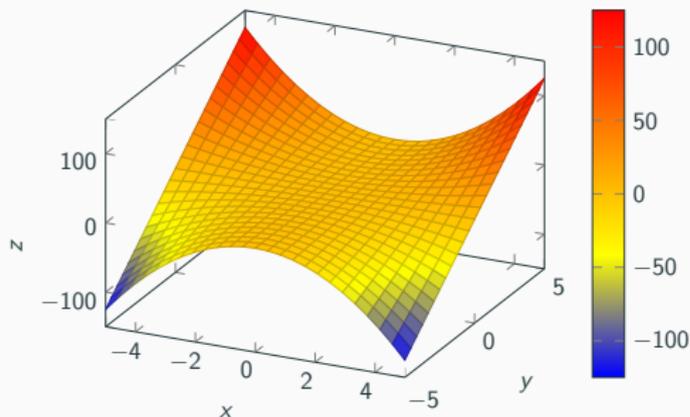
Surface Plot



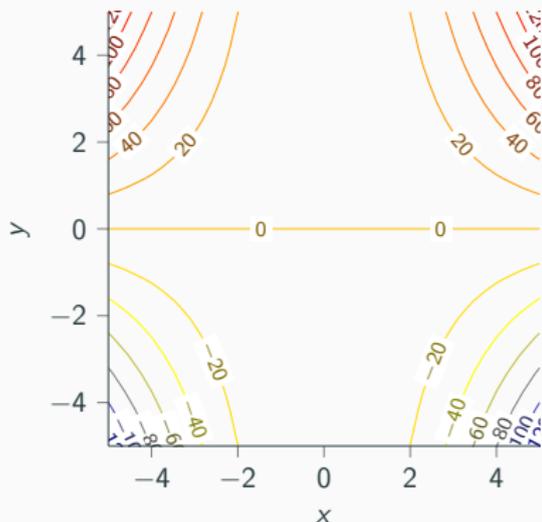
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Surface Plot



Contour plot, view from top



Then plot  $f(x, y) = K$  for varying  $K$ .

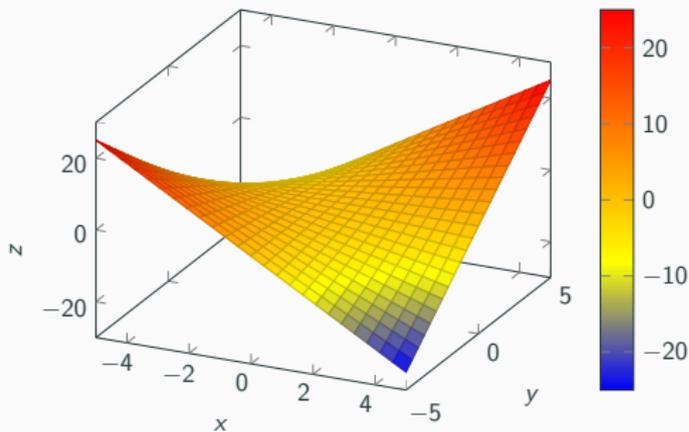
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$$z = f(x, y) = xy$$

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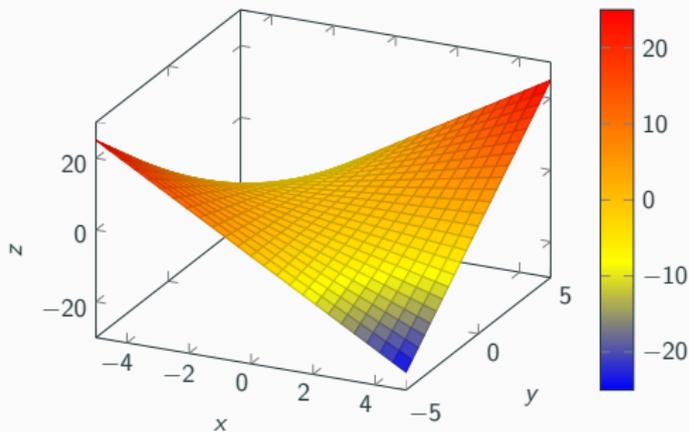
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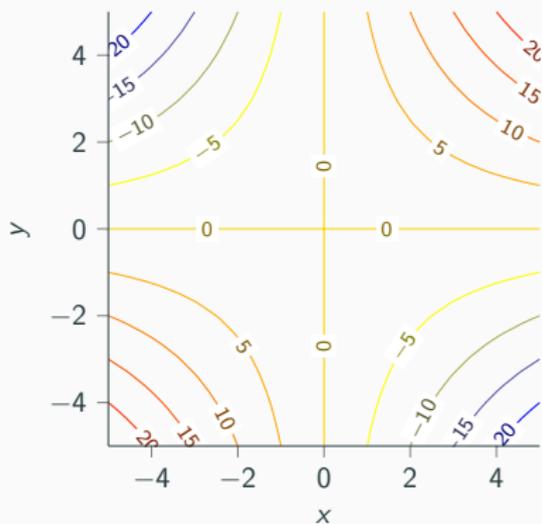
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$$z = f(x, y) = xy$$

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Contour plot, view from top



Then plot  $f(x, y) = K$  for varying  $K$ .

## Contours plots and gradients

Gradient denotes the steepest change.

All points on the contour have the same  $f(x, y)$

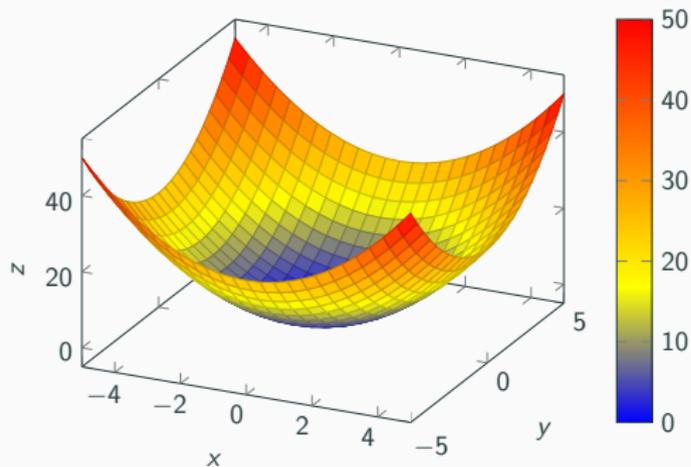
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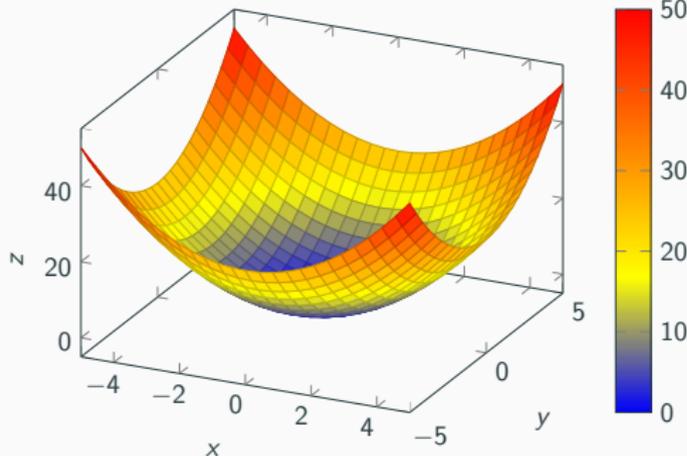
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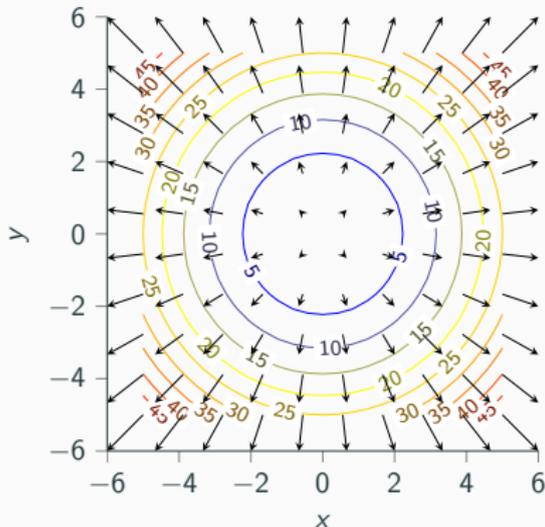
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Surface Plot



Contour plot, view from top



Then plot  $f(x, y) = K$  for varying  $K$ .

## Contour Plots and Gradients

Gradient denotes the direction of steepest descent.

All points on the contour have the same  $f(x,y)$ .

Gradient denotes the direction in which there is a maximum increase in  $f(x,y)$