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Introduction

What is mathematical optimization

Finding an optimal set of parameters $\mathbf{x}$ which minimizes or maximizes an *objective function* $f(\mathbf{x})$, formally

$$\hat{\mathbf{x}} = \underset{\mathbf{x}}{\operatorname{argmin}} \; f(\mathbf{x})$$

Visualisation

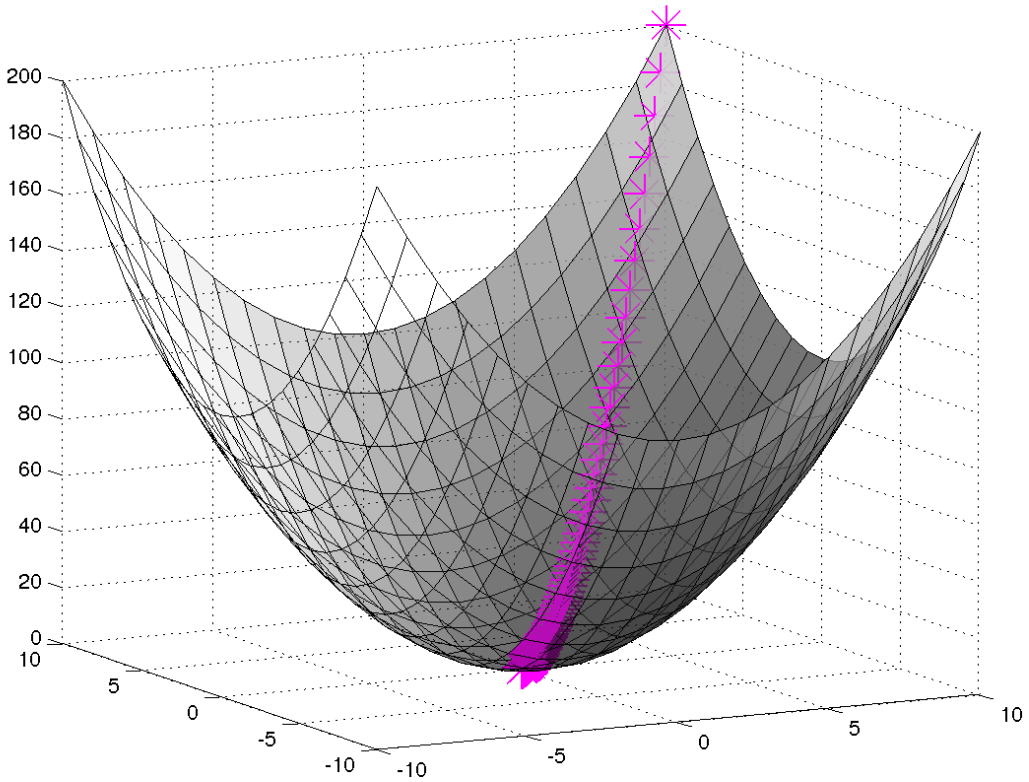

Figure: Minimization of convex function, *convex programming*

How do we take advantage of it

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- etc. etc. etc.

Examples

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Common problems

Important classes

- Gradient descent algorithms (Newton)
- Direct search algorithms
- Evolutionary strategies