

# Spatial interpolation (2/2): kriging

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**GEO1015**

**Digital terrain modelling**

<https://3d.bk.tudelft.nl/courses/geo1015>



**3D geoinformation**

Department of Urbanism  
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What is kriging?

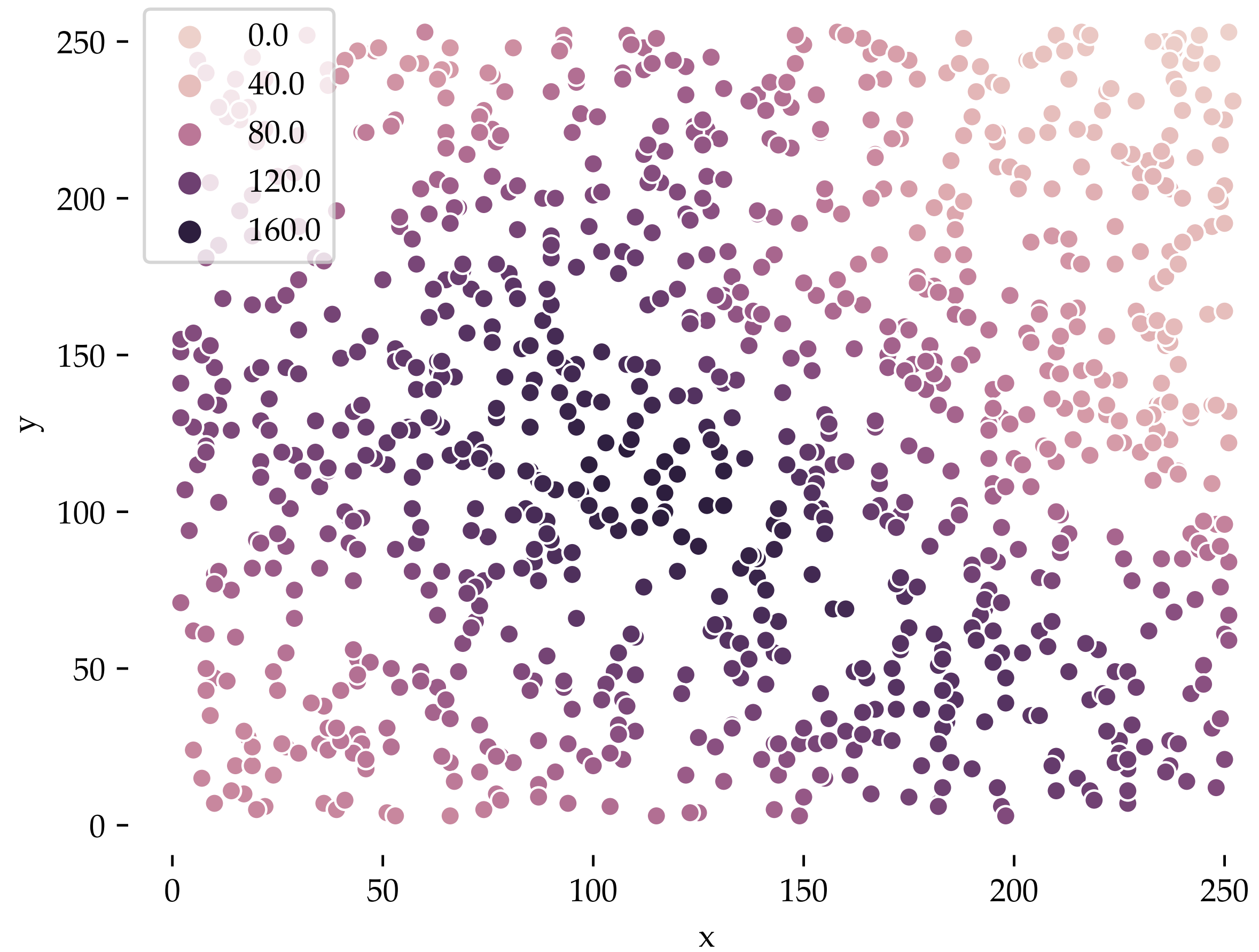
# What is kriging?

## In short

- Weighted average interpolation method...
- where the weights are based on the spatial correlation between the points...
- which is given by a custom geostatistical model for each dataset...
- which can be created using a variogram.

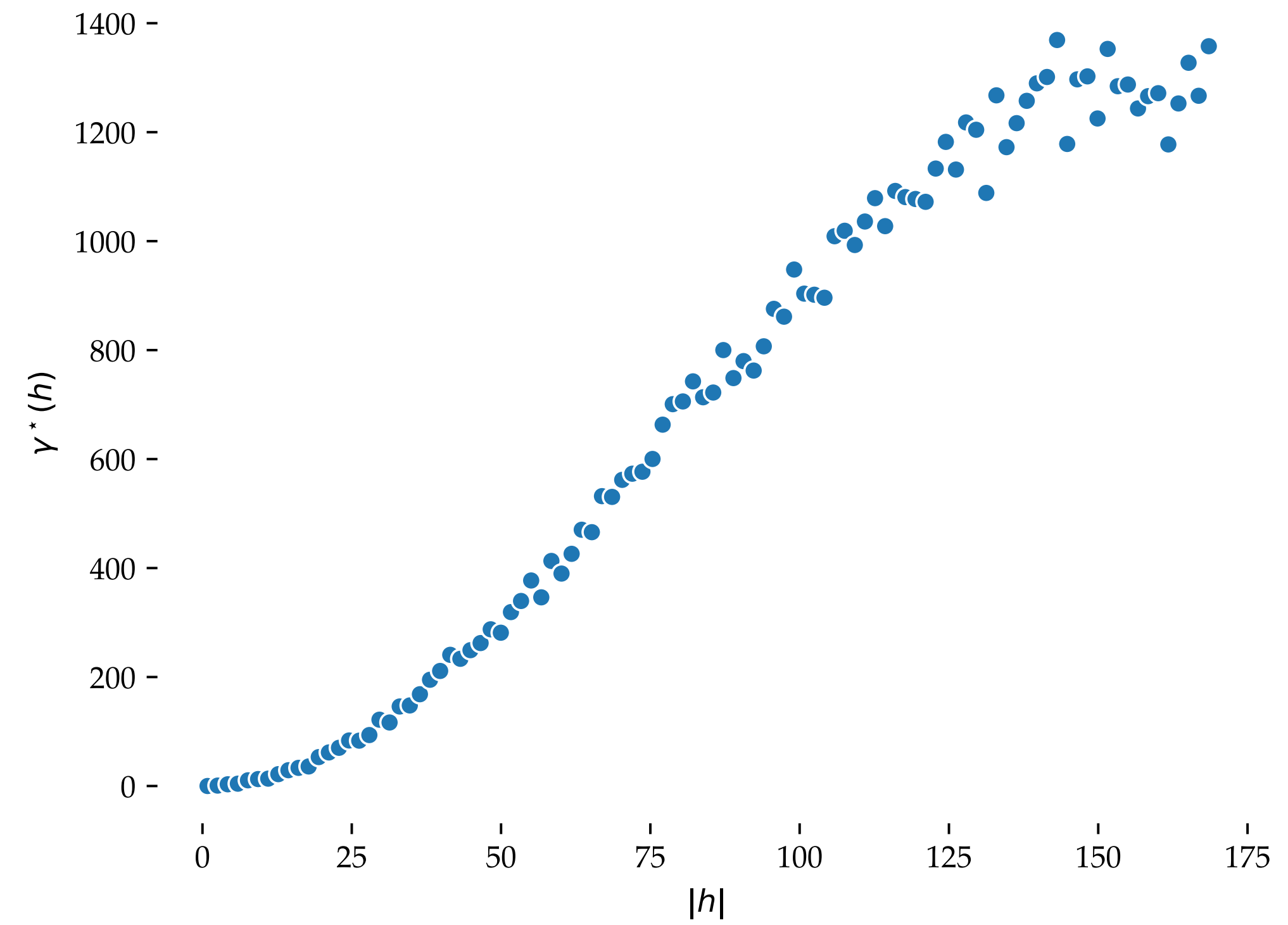
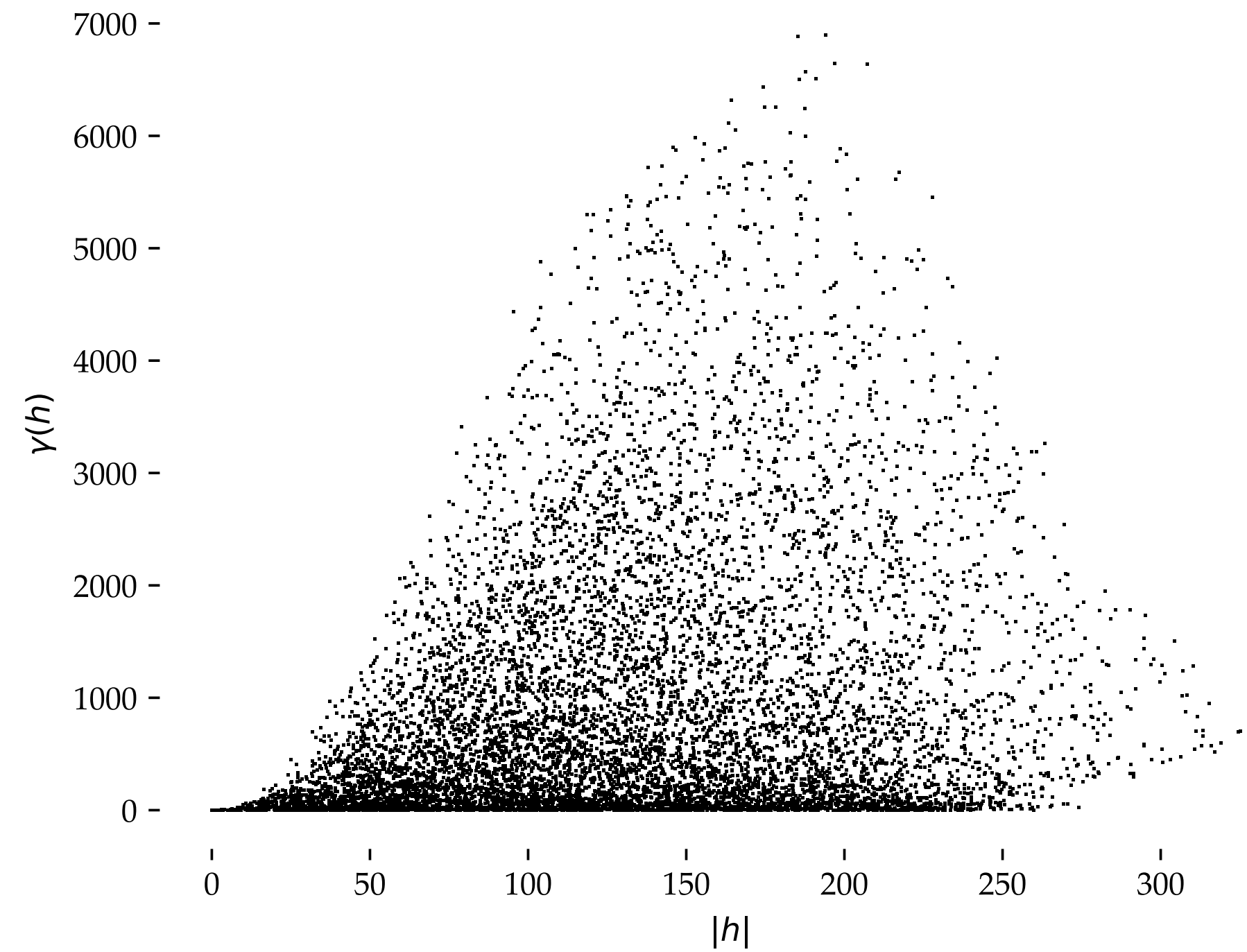
# What is kriging?

Start



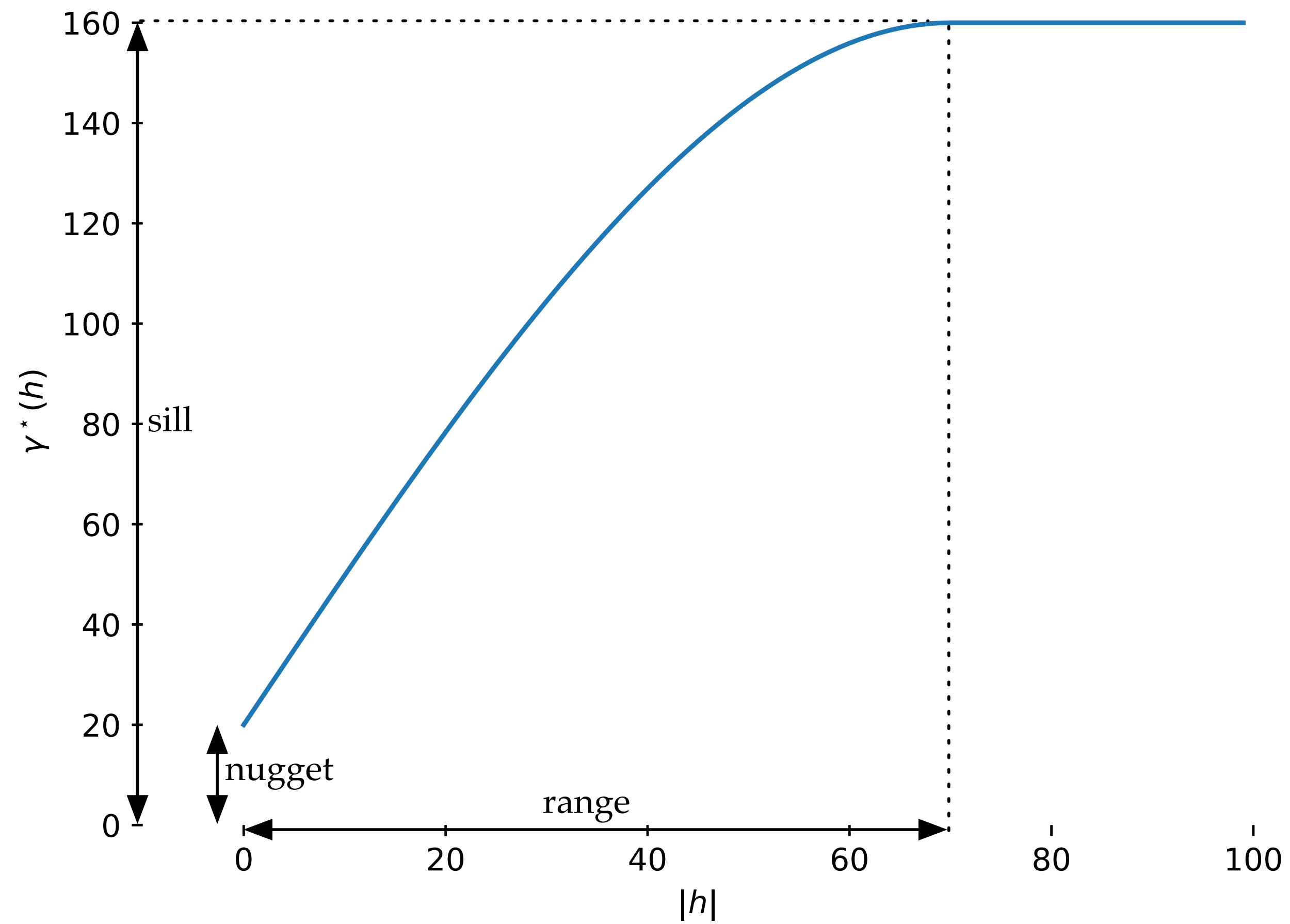
# What is kriging?

## Variogram



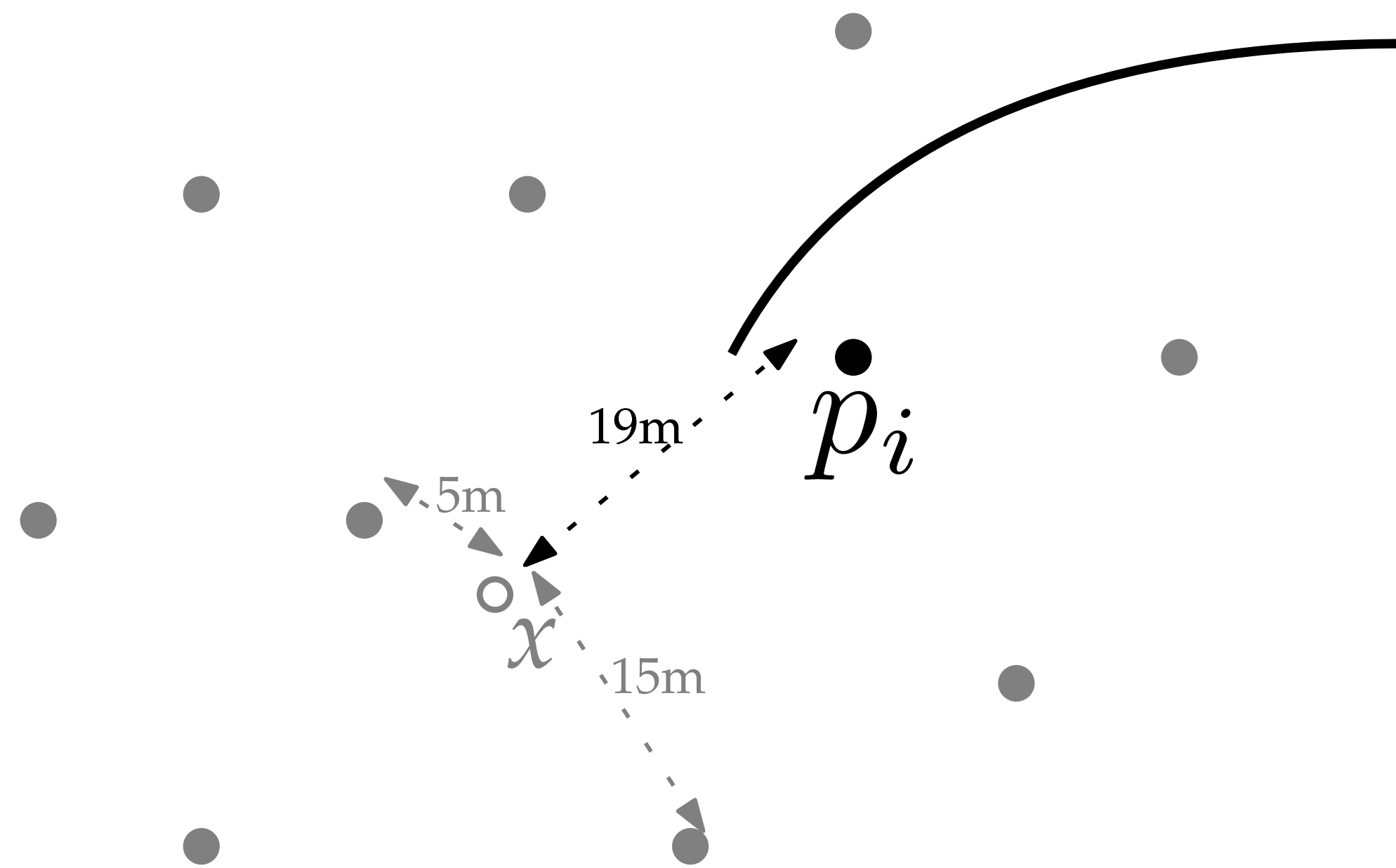
# What is kriging?

Geostatistical model



# What is kriging?

Spatial correlation



$$f(x) = \hat{a} = \frac{\sum_{i=1}^n w_i(x) a_i}{\sum_{i=1}^n w_i(x)}$$

# What is kriging?

Weighted average method

$$f(x) = \hat{a} = \frac{\sum_{i=1}^n w_i(x) a_i}{\sum_{i=1}^n w_i(x)}$$



# What is kriging?

## Differences with other methods

- Model correlation based on specific characteristics of each dataset
- Mathematically minimises interpolation error
- Handles complex data with noise, irregular point spacing or regular patterns

# Kriging basics

geostatistical model

$$Z = E[Z] + R.$$

expectation

(trend)

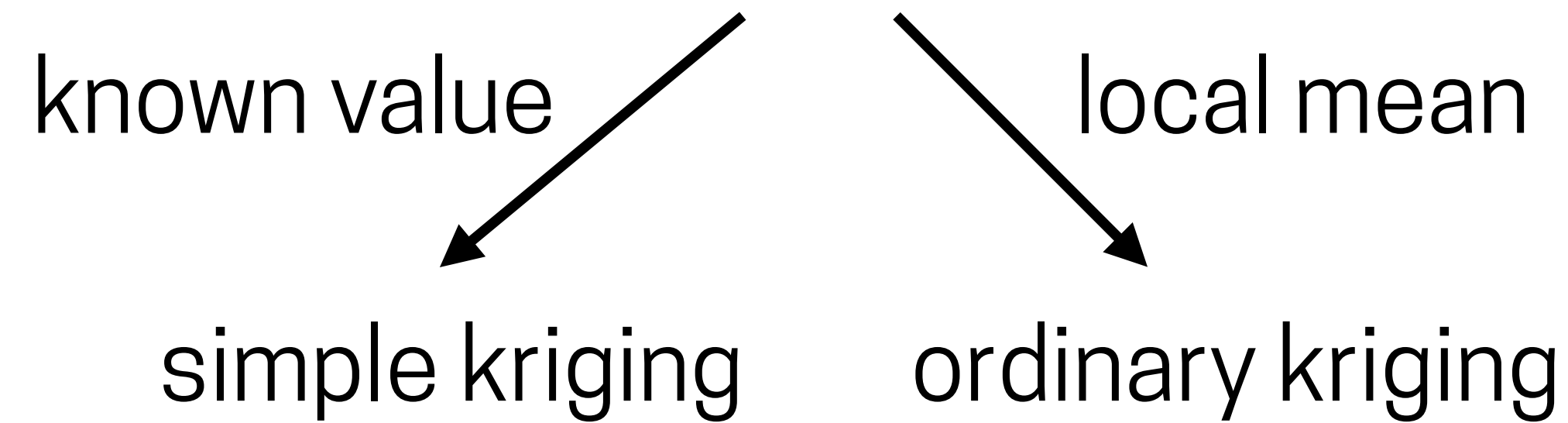
residual

(deviation from trend)

# Kriging basics

geostatistical model

$$Z = E[Z] + R.$$



# kriging in practice (pyinterpolate)

# What is pyinterpolate?

- Python library for geostatistics
- IDW, simple kriging and ordinary kriging among others
- Various operations on variograms

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