Outline

- Input representation

- Linear Classification

- Linear Regression

- Nonlinear Transformation
Linear is limited

Data:

Hypothesis:
Another example

Credit line is affected by ‘years in residence’

but **not** in a linear way!

Nonlinear \( [[x_i < 1]] \) and \( [[x_i > 5]] \) are better.

Can we do that with linear models?
Linear in what?

Linear regression implements

$$\sum_{i=0}^{d} w_i x_i$$

Linear classification implements

$\text{sign} \left( \sum_{i=0}^{d} w_i x_i \right)$

Algorithms work because of linearity in the weights
Transform the data nonlinearly

\[(x_1, x_2) \xrightarrow{\Phi} (x_1^2, x_2^2)\]