Часть 9: Нормализация

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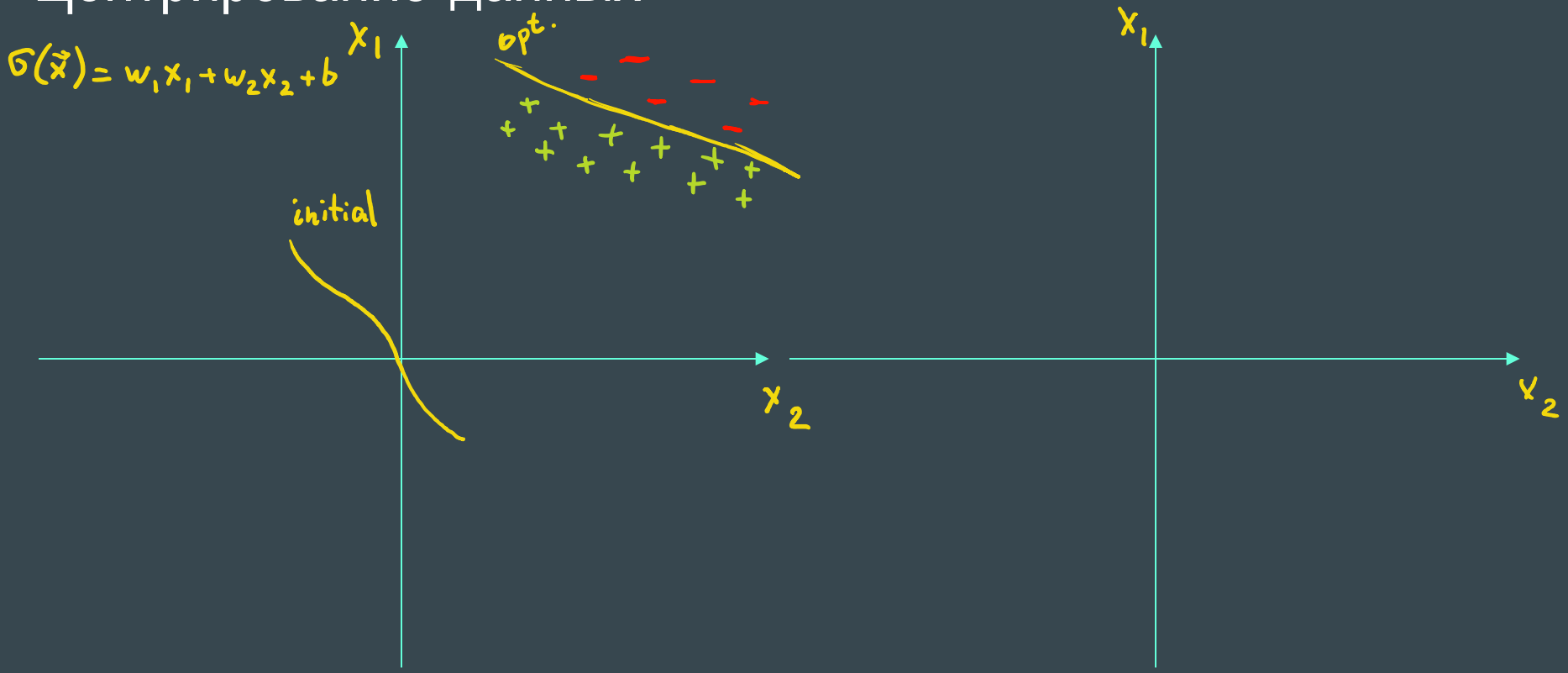
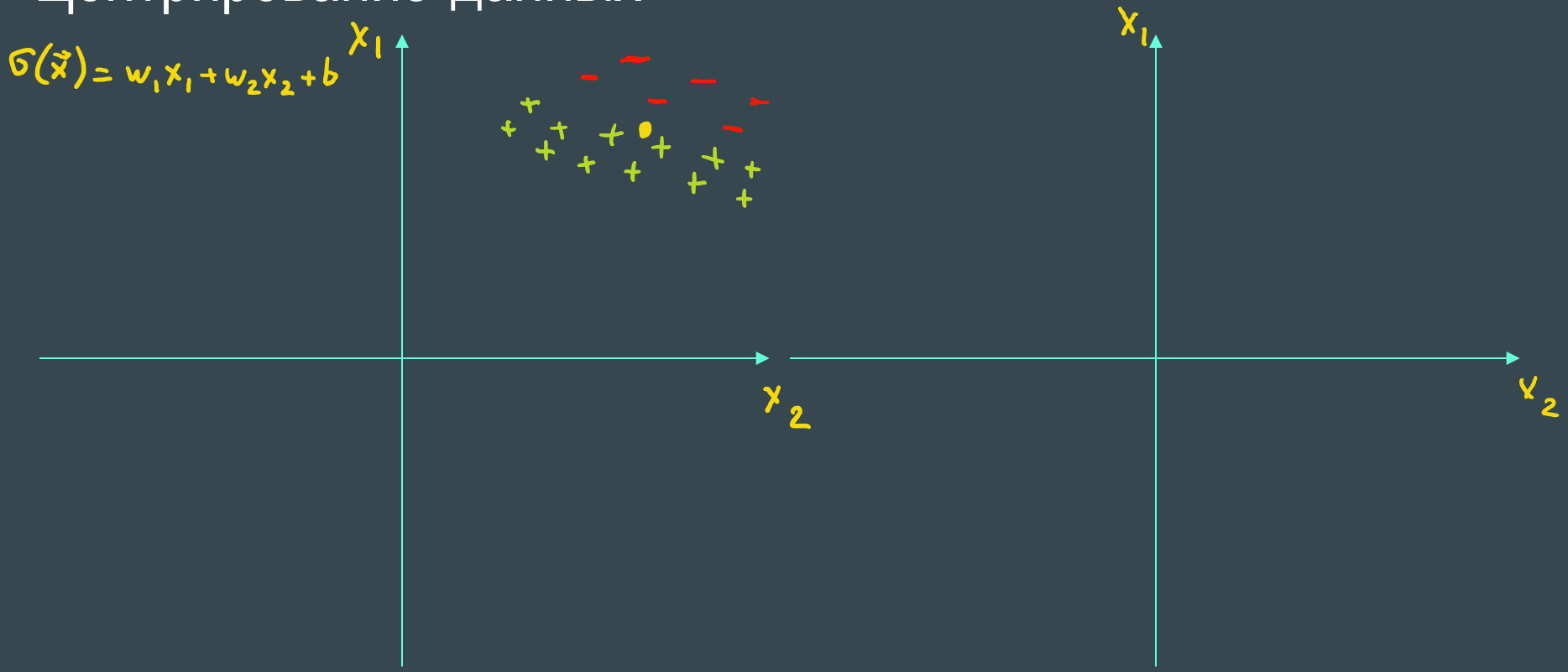
Романов Михаил, Игорь Слинько

Центрирование данных

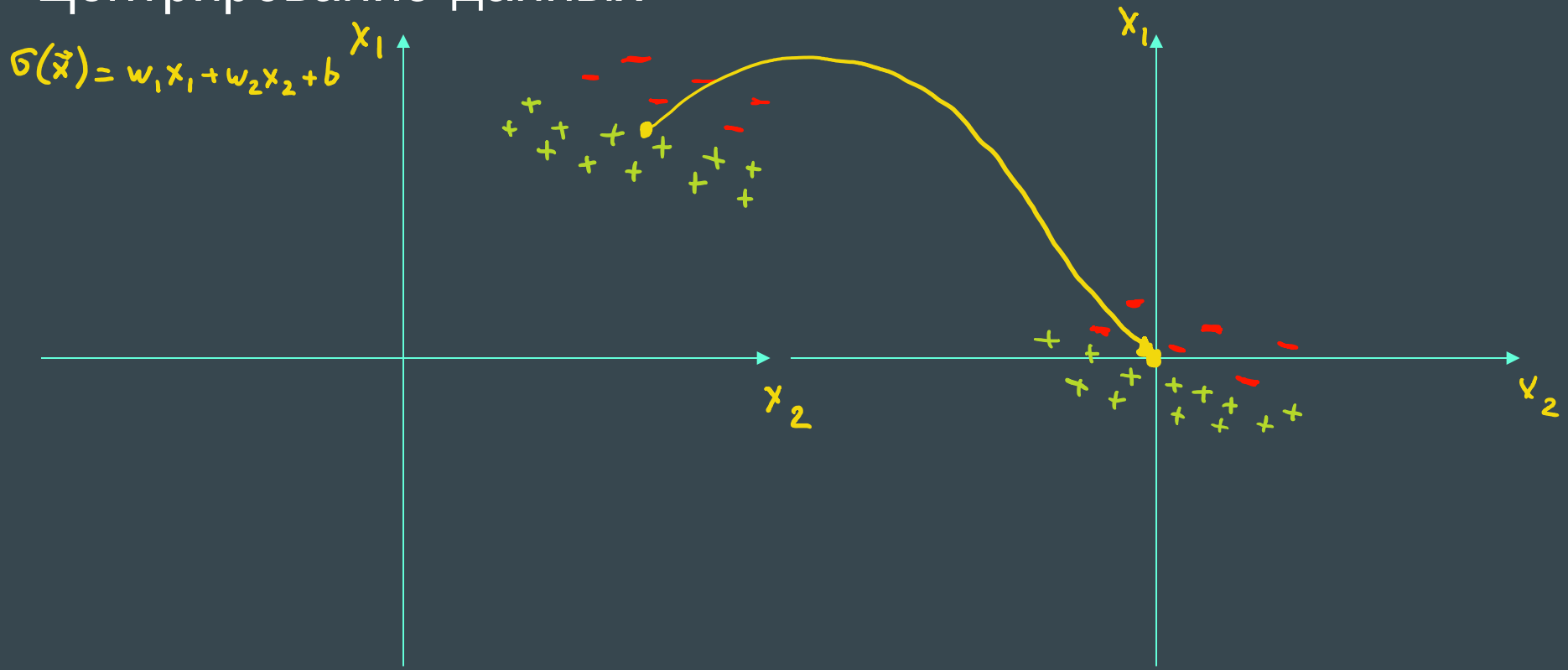


Центрирование данных

$\sigma(\vec{x}) = w_1 x_1 + w_2 x_2 + b$

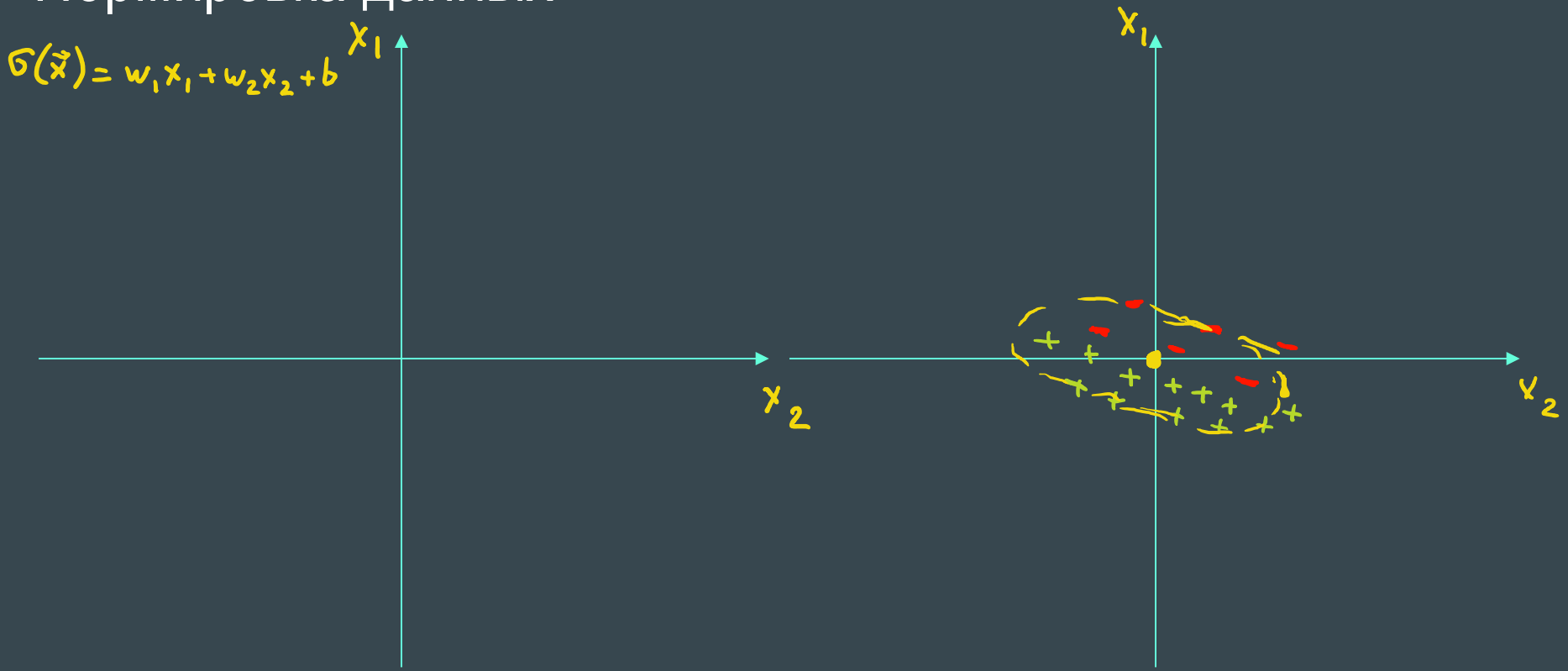


Центрирование данных



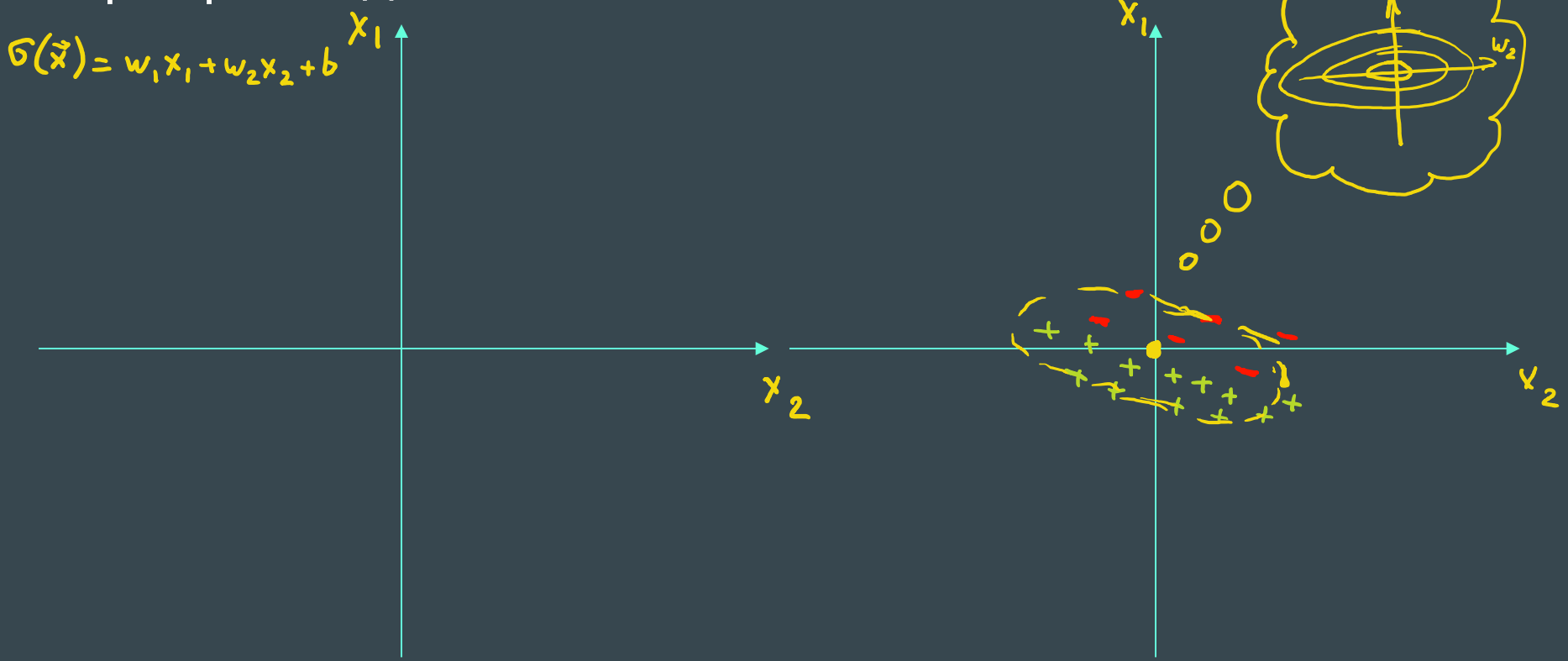
Нормировка данных

$\sigma(\vec{x}) = w_1 x_1 + w_2 x_2 + b$



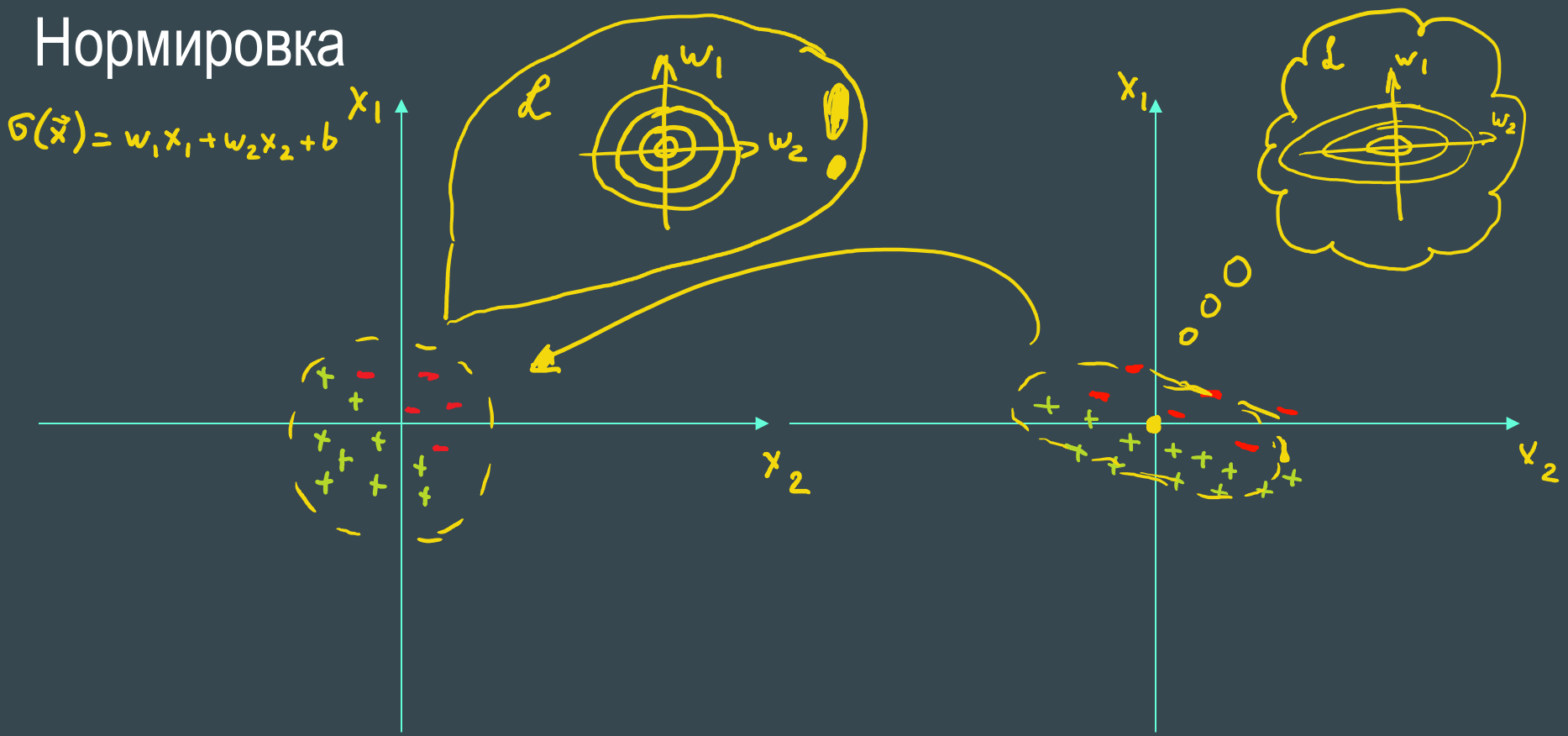
Нормировка данных

$\sigma(\vec{x}) = w_1 x_1 + w_2 x_2 + b$



Нормировка

$\sigma(\vec{x}) = w_1 x_1 + w_2 x_2 + b$



Нормировка данных

$$\vec{\tilde{x}} = \frac{\vec{x} - \vec{\mu}}{\vec{\sigma}}, \text{ где } \vec{\mu} = \frac{\sum_i \vec{x}_i}{N}, \vec{\sigma} = \sqrt{\frac{\sum_i (\vec{x}_i - \vec{\mu}_i)^2}{N-1}}$$

BatchNorm

$$\tilde{\vec{x}} = \frac{\vec{x} - \vec{\mu}_B}{\vec{\sigma}_B} \cdot \gamma + \beta \qquad \vec{\mu}_B = \frac{\sum_{i=1}^{N_b} \vec{x}_i}{N_b} \qquad \vec{\sigma}_B = \sqrt{\frac{\sum_{i=1}^{N_B} (\vec{x}_i - \vec{\mu}_B)^2}{N_B - 1}}$$

BatchNorm

$$\tilde{\vec{x}} = \frac{\vec{x} - \vec{\mu}_B}{\vec{\sigma}_B} \cdot \gamma + \beta \qquad \vec{\mu}_B = \frac{\sum_{i=1}^{N_b} \vec{x}_i}{N_b} \qquad \vec{\sigma}_B = \sqrt{\frac{\sum_{i=1}^{N_B} (\vec{x}_i - \vec{\mu}_B)^2}{N_B - 1}}$$

Inference: $\hat{\vec{\mu}} = \text{EMA}\ \vec{\mu}_B$

$\hat{\vec{\sigma}} = \text{EMA}\ \vec{\sigma}_B$