

# Knowledge Graph Analysis

## Solutions to Exercise Sheet 6

---

Dr. Asja Fischer, Prof. Jens Lehmann

December 23, 2016

### 1 IN CLASS

#### 1. **Weight parameters**

It holds  $\tau(u) = \sigma(2 \cdot u)$ , hence the problem is solved by doubling the input to the transfer function. We aim for

$$\sum_{i=1} w_i x_i + b = 2 \cdot \left[ \sum_{i=1} w'_i x_i + b' \right].$$

This is easily realized with the choice  $w'_i = 2 \cdot w_i$  and  $b' = 2 \cdot b$ . Hence doubling all weights and biases allows us "make the sigmoid twice as steep".

#### 2. **Size of the hidden layer**

The larger network will tend to have a lower training error because it can use the additional degrees of freedom to improve the fit on the training data. This automatically increases the risk of over-fitting. The two effects have a contrarious effect on the generalization error, hence in general we cannot know anything about which network generalizes better.