

$$L = \sum_{t=1}^T -\log \sum_{k=1}^K \frac{\exp(\mathbf{z}[t+k]^T \mathbf{z}^*[t+k])}{\sum_{z_- \in Z_{neg}} \exp(\mathbf{z}_-[t+k]^T \mathbf{z}^*[t+k]) + \exp(\mathbf{z}[t+k]^T \mathbf{z}^*[t+k])}$$