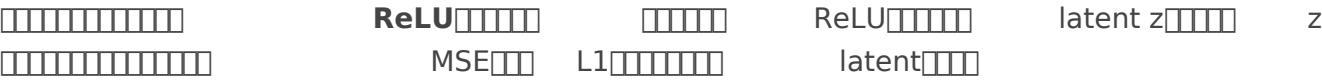
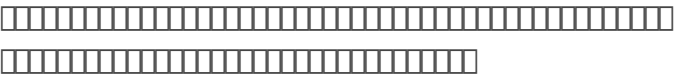




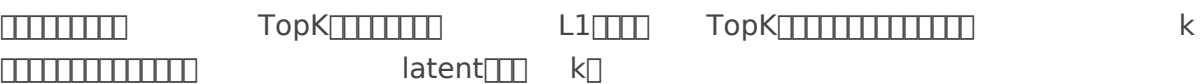
Ref <https://mp.weixin.qq.com/s/iZHPnnIncVFfa8QJOuH8qFg>



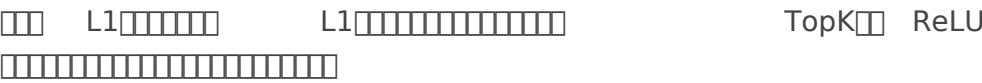
$$z = \text{ReLU}(W_{\text{enc}}(x - b_{\text{pre}}) + b_{\text{enc}})$$

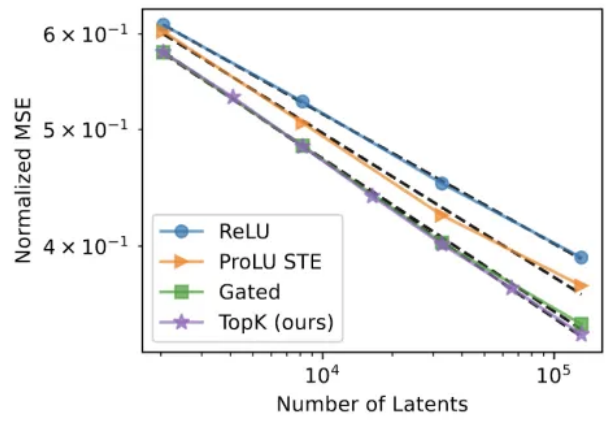
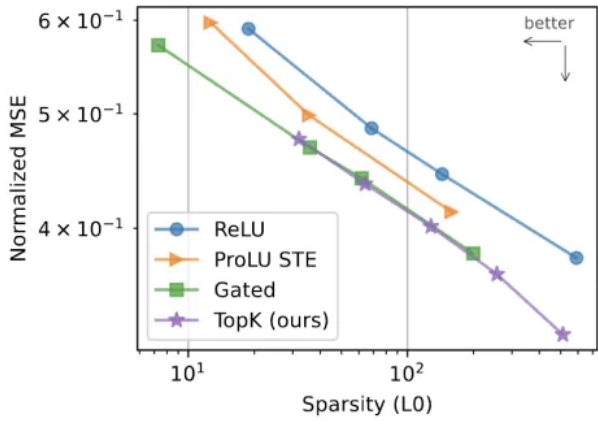
$$\hat{x} = W_{\text{dec}}z + b_{\text{pre}}$$

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$$z = \text{TopK}(W_{\text{enc}}(x - b_{\text{pre}}))$$





(a) At a fixed number of latents ( $n = 32768$ ), TopK has a better reconstruction-sparsity trade off than ReLU and ProLU, and is comparable to Gated.

(b) At a fixed sparsity level ( $L_0 = 128$ ), scaling laws are steeper for TopK than ReLU.<sup>6</sup>

Figure 2: Comparison between TopK and other activation functions.

latent

- latent
- top-k aux latent

1600 latent 7%

SAE GPT-4  
latent SAE

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