dim out

$\mathbf{W}_0 \in \mathbb{R}^{d \times k}$

Weight Sensitivity via **Hessian Matrix**

Global Metric   Local Metric

Rank Allocation

r

$\mathbf{A} \in \mathbb{R}^{d \times r}$

(Trainable) **A**

(Trainable) **B**

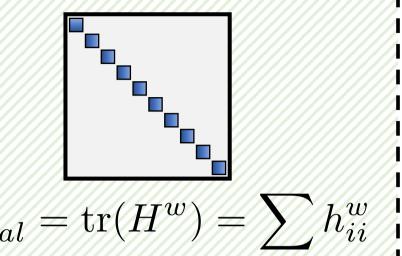$\mathbf{B} \in \mathbb{R}^{r \times k}$

Pretrained Weight (Frozen)

dim

Hessian Matrix of Weight Matrix w

$$\mathbf{H}^w = \begin{bmatrix} h_{11}^w & h_{12}^w & \cdots & h_{1n}^w \\ h_{21}^w & h_{22}^w & \cdots & h_{2n}^w \\ \vdots & \vdots & \ddots & \vdots \\ h_{n1}^w & h_{n2}^w & \cdots & h_{nn}^w \end{bmatrix}$$

Global Metric
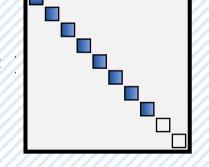
$$S_{global}^w = \mathrm{tr}(H^w) = \sum_i h_{ii}^w$$

Local Metric

$$S_{Topk}^w = \qquad S_{EffectiveRank}^w =$$

$$S_{\text{local}}^{(w)} = \beta_1 \cdot S_{Topk}^w + \beta_2 \cdot S_{EffectiveRank}^w$$

Rank Allocation

$$r^w = \frac{\theta^w}{\sum_w \theta^w} \cdot r_{total} \quad \bigg| \quad \theta^w = \gamma_1 \cdot S_{global}^w + \gamma_2 \cdot S_{local}^{(w)}$$