

$$\left(z_1^{(l)}, \dots, z_{n_l}^{(l)}\right) \in \mathbb{R}^{n_l \times d_l}$$

 $R^{(l-1)} \in \mathbb{R}^{n_{l-1} \times n_{l-1} \times r_{l-1}}$ 

 $(z_1^{(2)}, \dots, z_{n_2}^{(2)}) \in \mathbb{R}^{n_2 \times d_2}$ 

$$R^{(1)} \in \mathbb{R}^{n \times n \times r_1}$$

$$\left(z_1^{(1)}, \dots, z_n^{(1)}\right) \in \mathbb{R}^{n \times d}$$