

Task 1

Figure 1:

$$1. \frac{\partial E}{\partial n_4} = \frac{\partial E}{\partial n_6} \cdot \frac{\partial n_6}{\partial n_4}$$

$$2. \frac{\partial E}{\partial n_{2,5}} = \frac{\partial E}{\partial n_5} \cdot \frac{\partial n_{2,5}}{\partial n_{2,5}} = \frac{\partial E}{\partial n_7} \cdot \frac{\partial n_7}{\partial n_5} \cdot \frac{\partial n_5}{\partial n_{2,5}}$$

$$3. \frac{\partial E}{\partial (V_{1,1})_d} = \frac{\partial E}{\partial V_{1,1}} \cdot \frac{\partial V_{1,1}}{\partial (V_{1,1})_d} = \frac{\partial E}{\partial n_1} \cdot \frac{\partial n_1}{\partial V_{1,1}} \cdot \frac{\partial V_{1,1}}{\partial (V_{1,1})_d}$$

$$= \frac{\partial E}{\partial n_6} \cdot \frac{\partial n_6}{\partial n_3} \cdot \frac{\partial n_3}{\partial n_1} \cdot \frac{\partial V_{1,1}}{\partial (V_{1,1})_d} + \frac{\partial E}{\partial n_6} \cdot \frac{\partial n_6}{\partial n_4} \cdot \frac{\partial n_4}{\partial n_1} \cdot \frac{\partial V_{1,1}}{\partial (V_{1,1})_d}$$

$$4. \frac{\partial E}{\partial (X_{2,2})_d} = \frac{\partial E}{\partial n_6} \cdot \frac{\partial n_6}{\partial n_4} \cdot \frac{\partial n_4}{\partial n_2} \cdot \frac{\partial n_2}{\partial V_{2,2}} \cdot \frac{\partial V_{2,2}}{\partial (V_{2,2})_d} \cdot \frac{\partial (V_{2,2})_d}{\partial (X_{2,2})_d}$$

$$+ \frac{\partial E}{\partial n_7} \cdot \frac{\partial n_7}{\partial n_5} \cdot \frac{\partial n_5}{\partial n_2} \cdot \frac{\partial n_2}{\partial V_{2,2}} \cdot \frac{\partial V_{2,2}}{\partial (V_{2,2})_d} \cdot \frac{\partial (V_{2,2})_d}{\partial (X_{2,2})_d}$$

Figure 2:

$$1. \frac{\partial E}{\partial (V_{2,2})_d} = \frac{\partial E}{\partial n_6} \cdot \frac{\partial n_6}{\partial n_4} \cdot \frac{\partial n_4}{\partial n_2} \cdot \frac{\partial n_2}{\partial V_{2,2}} \cdot \frac{\partial V_{2,2}}{\partial (V_{2,2})_d} + \frac{\partial E}{\partial n_8} \cdot \frac{\partial n_8}{\partial n_4} \cdot \frac{\partial n_4}{\partial n_2} \cdot \frac{\partial n_2}{\partial V_{2,2}} \cdot \frac{\partial V_{2,2}}{\partial (V_{2,2})_d}$$

$$2. \frac{\partial E}{\partial n_{2,4}} = \frac{\partial E}{\partial n_4} \cdot \frac{\partial n_4}{\partial n_{2,4}} = \frac{\partial E}{\partial n_6} \cdot \frac{\partial n_6}{\partial n_4} \cdot \frac{\partial n_4}{\partial n_{2,4}} + \frac{\partial E}{\partial n_8} \cdot \frac{\partial n_8}{\partial n_4} \cdot \frac{\partial n_4}{\partial n_{2,4}}$$

$$3. \frac{\partial E}{\partial n_1} = \frac{\partial E}{\partial n_6} \cdot \frac{\partial n_6}{\partial n_3} + \frac{\partial E}{\partial n_7} \cdot \frac{\partial n_7}{\partial n_5} \cdot \frac{\partial n_5}{\partial n_1}$$

Task 2

$$n_k = k$$

Task 3

$$1. (64 \times 64 \times 2 + 1) \times 96 = 786528$$

$$2. (6 \times 6 \times 2 + 1) \times 96 = 7008$$

$$3. (1 \times 1 \times 2 + 1) \times 96 = 288$$