

# 學術部理論部課

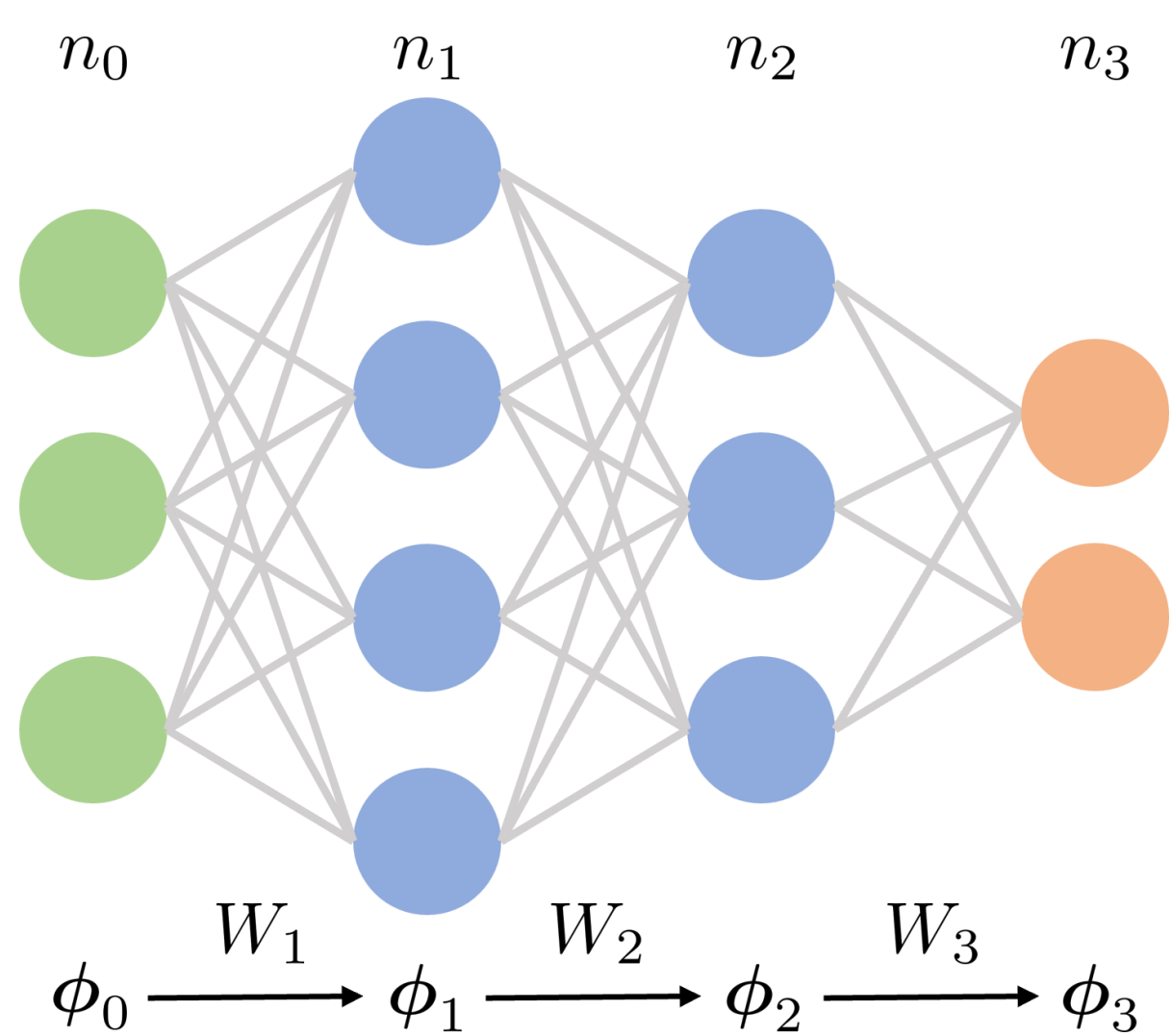
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## 介紹

與系學會學術部合作，提供系上同學部課學習課外知識。依據本人興趣，提出開授「理論部課」，旨介紹一些與電機相關、較為數學的內容。

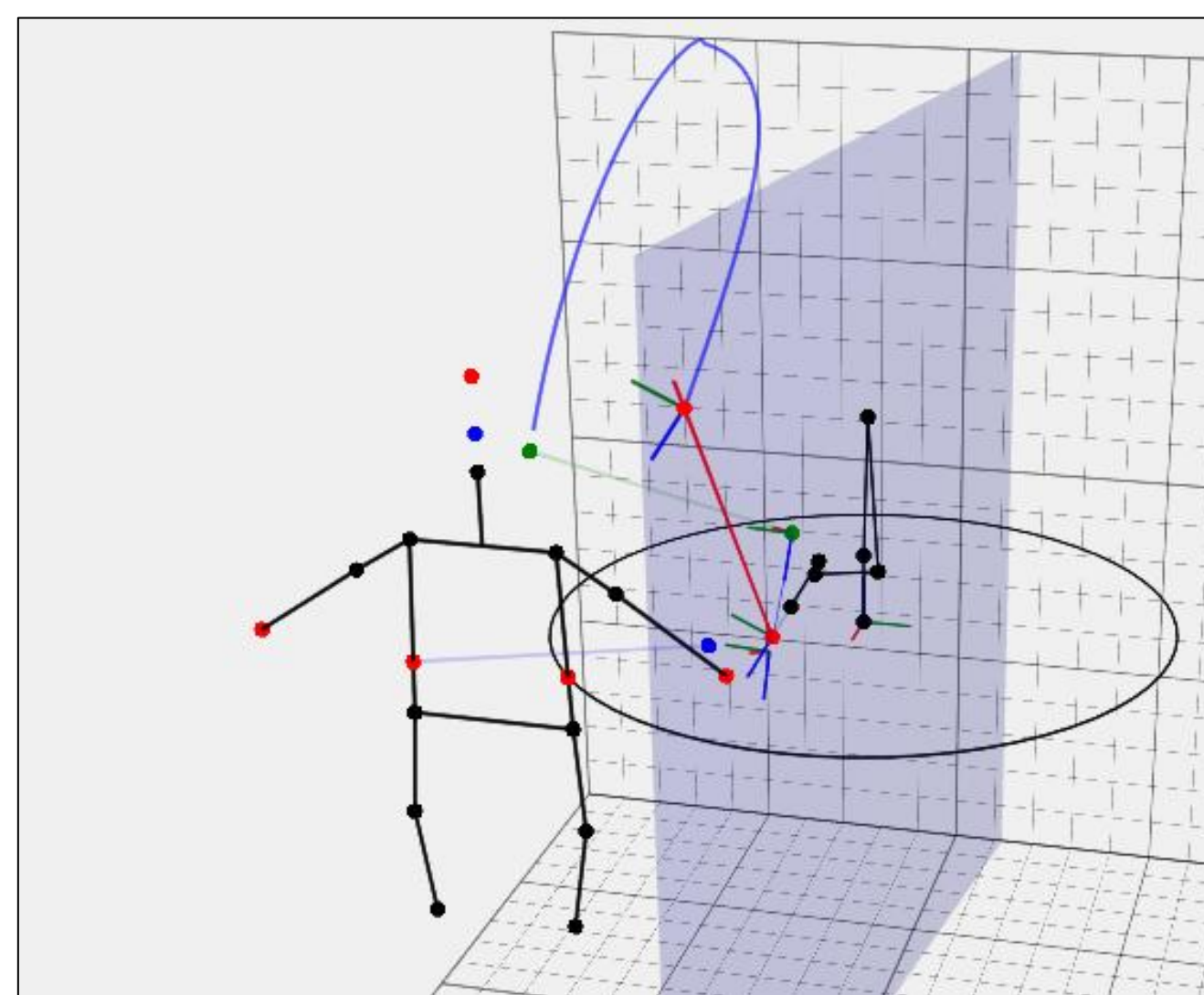
## 歷來理論部課主題

### 矩陣微分



$$\frac{\partial^n f}{\partial X^n}[H] = \left. \frac{d^n}{dt^n} f(X + tH) \right|_{t=0}$$

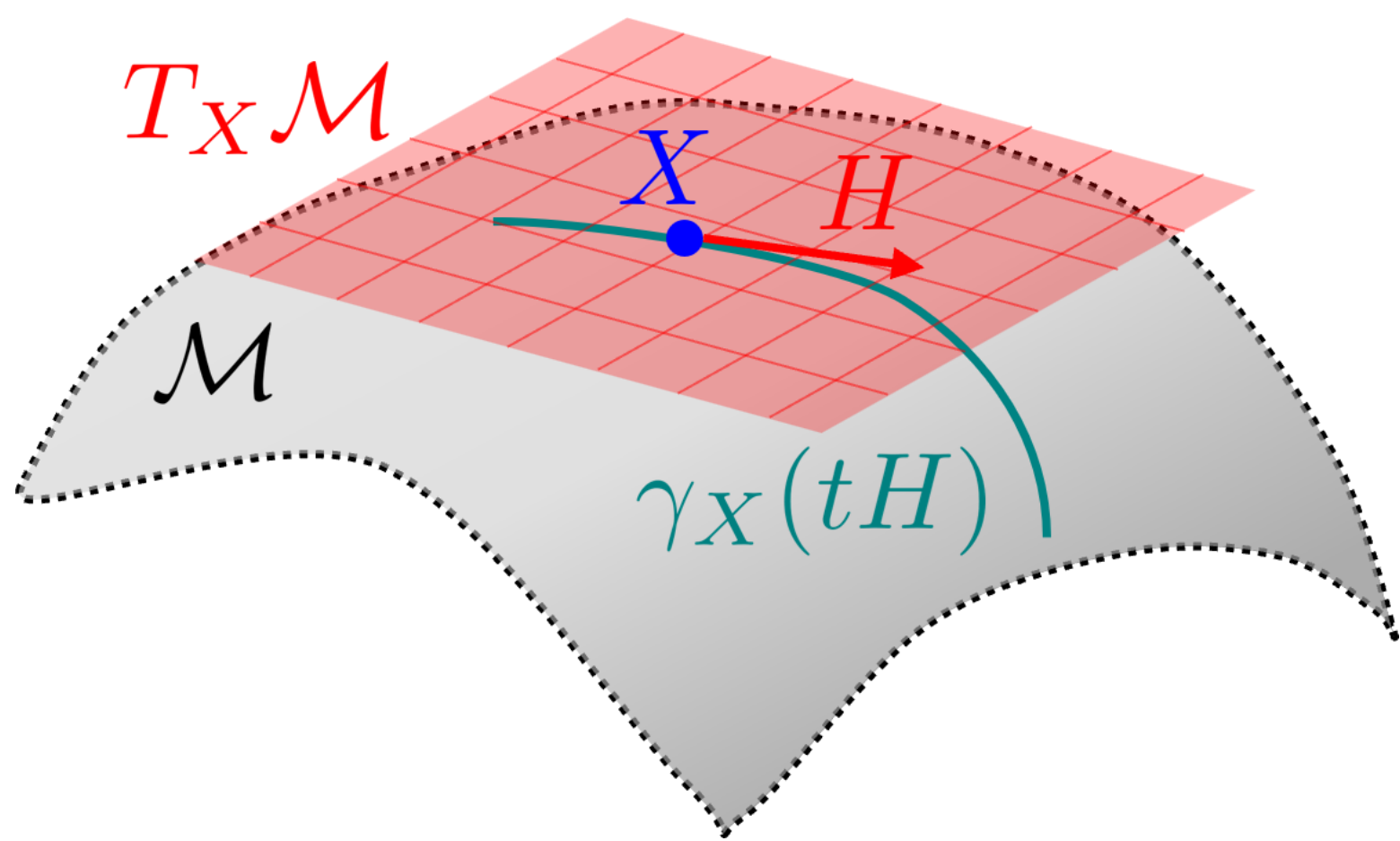
### 四元數



$$\mathbb{H} = \text{span}\{1, i, j, k\}$$

$$p' = e^{\hat{n}\theta/2} p e^{-\hat{n}\theta/2}$$

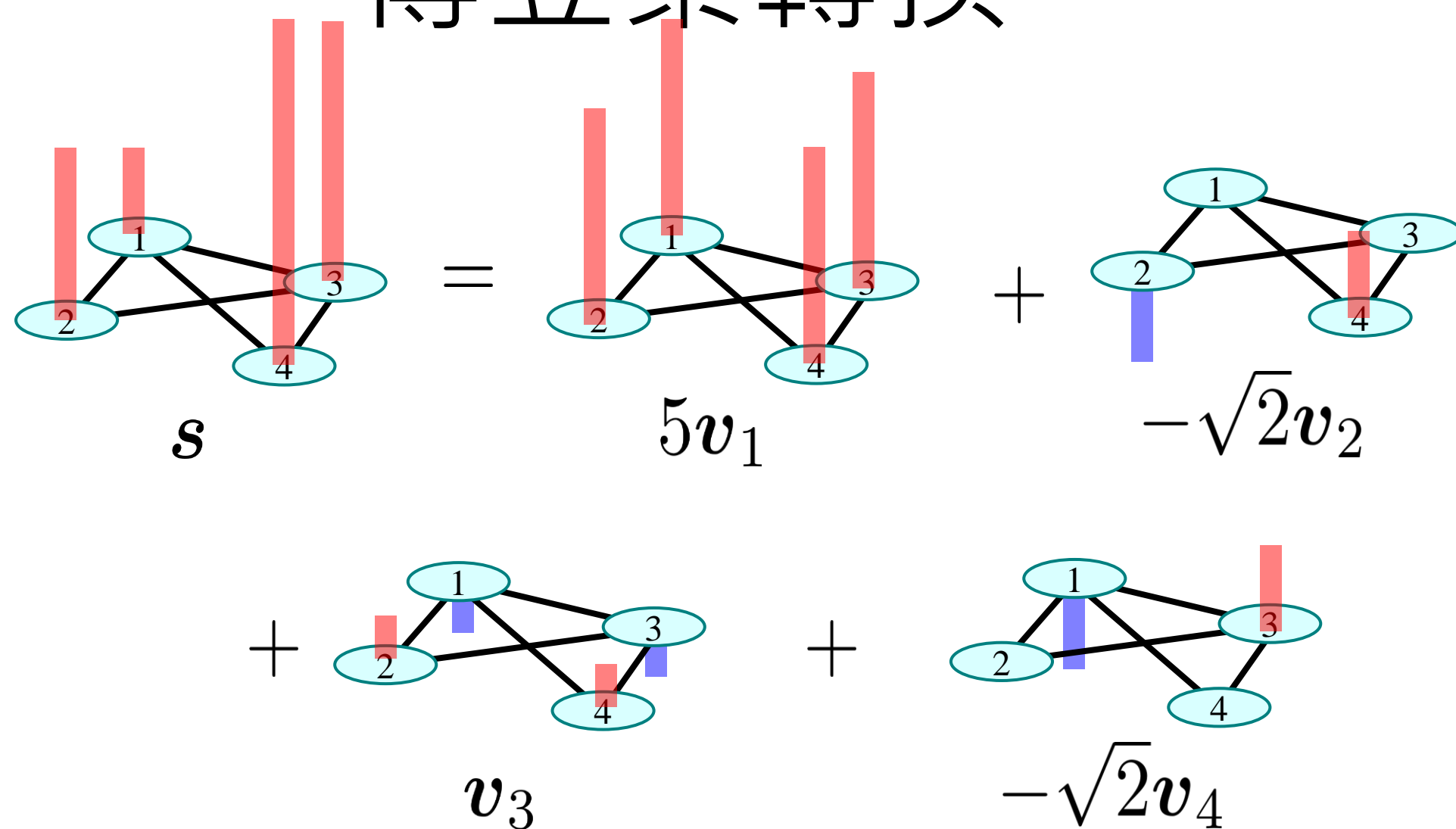
### 流形最佳化



$$X_{t+1} = X_t - \mu \cdot \text{grad} f(X_t)$$

$$\frac{\partial f}{\partial X}[H] = \langle \text{grad} f(X), H \rangle_{T_X \mathcal{M}}$$

### 傅立葉轉換



$$L = D - A = V \Lambda V^H$$

Graph Laplacian

$$= \sum_i \lambda_i v_i v_i^H$$