

$$\vec{\mathbb{N}}^r = \{m_1 \geq m_2 \geq \cdots \geq m_r \geq 0\} \text{ partitions length } \leq r$$

$$\vec{\mathbb{N}}^r_n = \frac{m_1 \geq m_2 \geq \cdots \geq m_r \geq 0}{m_1 + \cdots + m_r = n} \text{ partitions of n length } \leq r$$

$$\vec{\mathbb{N}}^n_n = \frac{m_1 \geq m_2 \geq \cdots \geq m_n \geq 0}{m_1 + \cdots + m_n = n} \text{ partitions of n}$$

$$\text{conjugacy classes } \mathbb{C}(n) / \sim = \vec{\mathbb{N}}^n_n$$

$$\text{cycle type } k_1|k_2|\cdots|k_n$$

$$k_i = \#\{\text{cycles length } = i\}$$

$$\sum_{i \geq 1} i k_i = n$$

$$\text{LHS} = \frac{k_1 \cdots k_n \geq 0}{k_1 + 2k_2 + \cdots + nk_n = n} = \frac{k_1:k_2\cdots \geq 0}{\sum_{i \geq 1} i k_i = n}$$

$$j > n \Rightarrow k_j = 0$$

$$k_i = m_i - m_{i+}$$

$$\Rightarrow n = m_1 + \cdots + m_r = k_1 + 2k_2 + \cdots + nk_n$$

$$\hat{\text{SU}}^{\mathbb{C}}_{n+} = \vec{\mathbb{N}}^n = \{m_1 \geq m_2 \geq \cdots \geq m_n \geq 0\} \text{ partitions length } \leq n$$

$$\hat{\text{SU}}^{\mathbb{C}}_2 = \mathbb{N}$$