

## Tutorial 01: Jan 15

1.  **$\Theta$ -notation**

Prove from first principles that  $n^3 \in \Theta(4n^3 - 3n^2 + 2n - 1)$ .

2. **Little- $o$** 

(a) Prove from first principles that  $\frac{1}{n} \in o(1)$ .

(b) Prove from first principles that  $2000n^2 \in o(n^n)$ .

3. **Relationships between order-notations**

Assume  $f$  and  $g$  are positive functions. Disprove following statement using definitions of order notations.

There exists  $f(n)$  and  $g(n)$  such that  $f(n) \in o(g(n))$  and  $f(n) \in \omega(g(n))$