(P1) (10)

$$f(n) = a_k n^k + a_{k-1} n^{k-1} + \dots + a_0$$

$$K < L \qquad g(n) = b_L n^L + b_{L-1} n^{L-1} + \dots + b_0$$

$$f(n) = O(g(n)) \iff \lim_{n \to \infty} \frac{f(n)}{g(n)} \overset{?}{=} 0$$

$$\lim_{n \to \infty} \frac{a_k n^k + \dots + a_0}{b_L \cdot n^L + \dots + b_0} = \dots = \qquad \text{del H. (Lukrazy)}$$

$$= \lim_{n \to \infty} \frac{a_k \cdot k \cdot (k-1) \cdot \dots \cdot 1}{b_L \cdot n^{L-k} \cdot L \cdot (L-1) \cdot \dots \cdot (L-k+1) + \dots + \dots} =$$

$$= \lim_{n \to \infty} \frac{a_k \cdot k!}{n^{L-k} \left(b_L \cdot \frac{1}{(L-k)!} + b_{L-1} \cdot \dots \cdot \frac{1}{n} + \dots \right)} =$$

$\underset{\downarrow}{\infty} \qquad \underset{const_{>0}}{\underbrace{\qquad}} \qquad \underset{\downarrow}{\underbrace{\qquad}}$
0

$$= \left[\frac{const_{>0}}{\infty \cdot const_{>0}} \right] = O.$$