Zad. 1

MAURYCY BORKOWSKI

teza: $\quad |\alpha_i| \leq u \qquad nu < 0.01$

$$\prod_{i=1}^{n} (1+\alpha_i) = 1 + \eta_n \qquad |\eta_n| \leq 1.01\,nu$$

$$\prod_{i=1}^{n} (1+\alpha_i) < (1+u)^n = nu + \binom{n}{2}u^2 + \binom{n}{3}u^3 + \dots =$$

$$= 1 + nu + \binom{n}{2}u^2 + \dots \quad *$$

$$\binom{n}{2}u^2 = \frac{n(n-1)}{2!}u^2 \leq \frac{1}{2} \cdot 0.001\,nu$$

$$\binom{n}{3}u^3 = \frac{n(n-1)(n-2)}{3!}u^3 \leq \frac{1}{6} \cdot 0.000001\,nu \qquad S \geq 0$$

$$* = 1 + nu + \binom{n}{2}u^2 + \binom{n}{3}u^3 + \binom{n}{4}u^4 + \dots \leq nu + \frac{1}{2}0.001\,nu + \frac{1}{6}0.000001\,nu + S \leq 1 + 1.001\,nu$$

Mamy więc $\prod_{i=1}^{n} (1+\alpha_i) \leq 1 + 1.001\,nu$ zatem

$$\prod_{i=1}^{n} (1+\alpha_i) = 1 + \eta_n$$