T1

$\tilde{\theta}_3 = x_{max}$

$\xi \sim R(0, \theta)$

$\Psi(y) = (F(z))^n$

$q = \Psi'(y) = n(F(y))^{n-1} F'(y) = n\left(\frac{y}{\theta}\right)^{n-1} \frac{1}{\theta} \{(0, \theta)\}$

$M[\tilde{\theta}_3] = \int_{-\infty}^{\infty} y q(y) dy = \int_0^{\theta} y^n \frac{n}{\theta^n} dy =$

$= \frac{n}{\theta^n} \frac{\theta^{n+1}}{n+1} = \frac{\theta n}{n+1}$ смещенная

$D[\tilde{\theta}_3] = M[\tilde{\theta}_3^2] - M[\tilde{\theta}_3]^2$

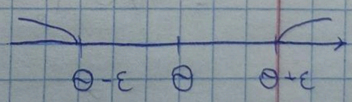
$M[\tilde{\theta}_3^2] = \int_0^{\theta} y^2 q(y) dy = \int_0^{\theta} \frac{n}{\theta^n} y^{n+1} dy = \frac{n}{\theta^n} \cdot \frac{\theta^{n+2}}{n+2}$

$D[\tilde{\theta}_3] = \cancel{\theta}\ \theta^2 \frac{n}{(n+2)(n+1)^2} \xrightarrow[n \to \infty]{} 0$

По определению

$\tilde{\theta}_3 \xrightarrow{P} \theta \quad \forall \theta > 0$

$\forall \varepsilon > 0 \quad P(|\tilde{\theta}_3 - \theta| \geq \varepsilon) \xrightarrow[n \to \infty]{} 0$



$P(x_{max} \geq \theta + \varepsilon) = 0$

$P(x_{max} \leq \theta - \varepsilon) = P(x_{max} < \theta - \varepsilon) = \cancel{\varphi(y)}$

$= \varphi(\theta - \varepsilon) = (F(\theta - \varepsilon))^n = \left(\frac{\theta - \varepsilon}{\theta}\right)^n \xrightarrow[n \to +\infty]{} 0$

$0 < \theta - \varepsilon < \theta$ состоятельная оценка