A)
$$X=(x_{1},...,x_{N})-nex \sim U[o_{1}\theta]$$

a) Max. likelihood

$$L(\theta) = p(X|\theta) = \bigcap_{i=1}^{N} p(x_{i}|\theta)$$

Likelihood

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$$\theta_{HL} = avgmax L(\theta) = avgmax \bigcap_{i=1}^{N} p(x_{i}|\theta) = avgmax \bigcap_{i=1}^{N} p(x_{i}|\theta) = avgmax \bigcap_{i=1}^{N} log p(x_{i}|\theta) = 0$$

Where $p(x_{i}|\theta) = \frac{1}{\theta}$

= arguax
$$\left(-N\log\theta\right)$$

$$\frac{\partial \left(-N\log\theta\right)}{\partial\theta} = -\frac{N}{\theta}$$

Mor znaem, wo $\theta \ge x_i$ i=1,...,N, $\tau.e.$ wo $\theta \ge \max(x) = x_{(N)}$ up story y nac yorbaneware φ -un =>

nago berspar namuentuele bosseonence
$$\theta_{,\tau.e.}$$

$$\theta_{nl} = \mathbf{x}_{(N)}$$

$$\rho(X|\Theta) \sim U[O,\Theta]$$

$$\rho(\Theta|A,P) = \frac{\angle B}{\Theta^{2+1}} [P \leq \Theta], P > 0, m = \max(X_{M},P)$$

$$P(\theta|X) = \frac{P(X|\theta)P(\theta|d,\beta)}{\int_{0}^{+\infty} d\theta} = \frac{e^{-N-\lambda-1}d\theta}{\int_{0}^{+\infty} d\theta} = \frac{e^{-N-\lambda-1}d\theta}{\int_{0$$

$$\mathcal{I} = N + \lambda$$
 $= \frac{\mathcal{I}_{\beta}^{\alpha}}{\partial^{\alpha} + 1} \left[\beta \leq \Theta \right] - \text{Paveto}$
 $\beta = M$

c) Cranicounu

$$\rho(X|\theta) = \theta^{-N} [x_{(N)} \leq \theta]$$

$$p(\theta|J_1\beta) = J_1\beta^{-1}J_1\beta^{-1}$$
 [$\beta \leq \theta$], $J_1 = \max(\beta, x_{(M)})$

$$p(\theta|x) = \frac{p(x|\theta)p(\theta|\lambda_1\beta)}{\sqrt[3]{p(x|\theta)p(\theta|\lambda_1\beta)d\theta}}$$

$$X \int_{0}^{+\infty} \rho(x|\theta) \rho(\theta|\lambda_{1}\beta)d\theta = \int_{m}^{+\infty} \theta^{-n} d\beta d\theta =$$

$$= \mathcal{L}_{p}^{d} \int_{M}^{+\infty} \theta^{-N-d-1} d\theta = \frac{\mathcal{L}_{p}^{d}}{(-N-d)} \theta^{-N-d} \Big|_{M}^{+\infty} =$$

Eule
$$-N-d-1 \ge -1 = > -N-d \ge 0$$
, to $\int_{-n}^{n} packognace$
T.e. $N+d \ge 0$

$$\Rightarrow \frac{\angle \beta}{N+d} m^{-N-d} = \frac{\angle \beta}{(N+d)m^{N+d}}$$

$$p(\theta|x) = (N+2)m^{N+2} \cdot \theta^{-N-2-1} [m \leq \theta]$$

$$E \theta = \int_{0}^{+\infty} \theta \rho(\theta|x) d\theta = (N+L)m^{N+L} \int_{0}^{+\infty} \theta^{-N-L} d\theta =$$

$$= \left[\mathcal{X} = N+L \right] = \mathcal{X} m^{2} \int_{0}^{+\infty} \theta^{-2} d\theta = \mathcal{X} m^{2(-1)} \int_{0}^{-2+1} \theta^{-2} d\theta =$$

$$= \mathcal{X} m^{2} \frac{1}{2-1} m^{-2} + 1 = \frac{\mathcal{X}}{2-1} m^{2} = \frac{\mathcal{X}}{2-1} m^{2} =$$

$$= \mathcal{X} m^{2} \frac{1}{2-1} m^{-2} + 1 = \frac{\mathcal{X}}{2-1} m^{2} = \frac{\mathcal{X}}{2-1} m^{2} = \frac{\mathcal{X}}{2-1} m^{2} =$$

$$= (n+L)m^{N+L} \frac{(-1)}{N+L} \theta^{-N-L} \frac{1}{2} m^{2} = m^{N+L} \frac{1}{2} m^{2} =$$

$$= (m)^{N+L} \frac{1}{2} m^{N+L} \frac{1}{2} m^{2} - m^{2} =$$

$$= (m)^{N+L} \frac{1}{2} m^{N+L} \frac{1}{2} m^{N+L} \frac{1}{2} m^{N+L} \frac{1}{2} m^{N+L} =$$

$$(n+L) \ln c = (n+L) \ln m + \ln 2$$

$$lnC = ln m + \frac{ln2}{N+d}$$

$$c = e^{\ln m + \frac{\ln 2}{\nu + \lambda}} = m(e^{\ln 2})^{\frac{1}{\nu + \lambda}} = m 2^{\frac{1}{\nu + \lambda}}$$

usga: argmax
$$p(\theta|x) = argmax \theta \quad [m \le \theta] \Rightarrow$$

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or $\theta \Rightarrow$ depen kannensma
goerynnee θ .

=>
$$m - m ga , rge m = max (\beta, X_{(N)})$$