AULA 3

ESTATÍSTICA BAYESIANA.

$$\frac{n}{\sum_i X_i} \xrightarrow{p} \theta$$

$$E[X_i] = \frac{1}{\theta}$$

$$E[\bar{X}_n] = \frac{1}{\theta}$$

$n \qquad 1$

$\overline{\Sigma X_i} = \overline{\bar{X}_n}$

θ É VMA V. A.

$$E[\theta] = \frac{1}{2}$$

$$\theta \in (0, \infty)$$

GAMA

$$\theta \sim GAMA(\alpha, \beta)$$

$$\xi(\theta) = \frac{\beta^{\alpha}}{\Gamma(\alpha)} \theta^{\alpha-1} e^{-\beta\theta}$$

$$E[\theta] = \frac{\alpha}{\beta} = \frac{1}{2}$$

$$Var(\theta) = \frac{\alpha}{\beta^{2}}$$

$$\theta \sim GAMA(\alpha = 1, \beta = 2)$$

$$\int^{\infty} \beta^{\alpha} \quad \alpha-1 \quad -\beta\theta$$

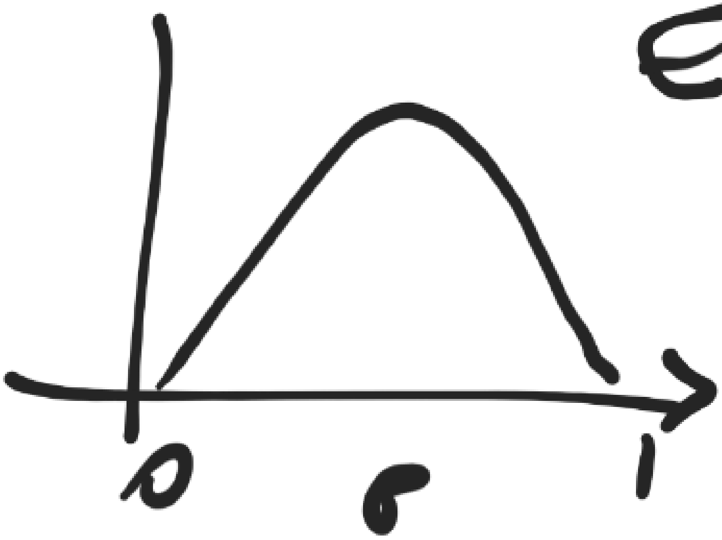
$$\int_0 \frac{\beta}{\Gamma(\alpha)} \theta \; e \; d\theta = 1$$

$$\frac{\beta^{\alpha}}{\Gamma(\alpha)} \int_0^1 \theta^{\alpha-1} e^{-\beta\theta} d\theta = 1$$

$$\int_0^{\infty} \theta^{\alpha-1} e^{-\beta\theta} d\theta = \frac{\Gamma(\alpha)}{\beta^{\alpha}} \quad \blacksquare$$

NÚCLEO
DA
GAMA

BETA(2, 2)



$E[P] = \frac{1}{2}$

DETERMINAR

$E(\theta)$

PARÂMETRO

$\equiv$

ELICITAR

$X_i \leftarrow$ ALTURA

$$f(x_i \mid \theta, 10) = \text{Normal}(\theta, 10)$$

$$f(\theta) = \text{Normal}(\mu_0, \sigma_0^2)$$

JUPITER

$$\theta = \{X, Y, Z\}$$

$$\mathcal{L}(\theta) = N_x(x)\, N_y(y)\, N_z(z)$$

$$\underbrace{\mu_x, 1}_{\text{HIPERPARAMETROS}} \qquad \mu_y, 1$$

$$\mu_x \sim N(0, 1)$$

EXEMPLO

TEMPO DUR.

$\alpha, \beta \leftarrow$ HIPER PARAMET

BERNSTEIN-VON MISES

TEOREMA.

TEOREMA 5

IID

$$f(x_1, x_2, \ldots, x_n \mid \theta)$$

$$= f(x_1 \mid \theta)\, f(x_2 \mid \theta) \cdots f(x_n \mid \theta)$$

$$f(x_1, x_2, \ldots, x_n \mid \theta) = \prod_{i=1}^{n} f(x_i \mid \theta)$$

$$\underbrace{\underline{f(\underset{\sim}{x} \mid \theta)}\, f(\theta)}$$

$$f(x, \theta)$$

$f(\underset{\sim}{x})$

$$g(\underset{\sim}{x}) = \int_{\Omega} \underbrace{f(\underset{\sim}{x}, \theta)}_{\text{CONJUNTA}} \, d\theta$$

$$\xi(\theta \mid \underset{\sim}{x}) = \frac{f(\underset{\sim}{x}, \theta)}{g(\underset{\sim}{x})}$$

$$\xi(\theta) = c \, \theta^{1-1} e^{-2\theta}$$

$$E[\theta \mid \underset{\sim}{x}] = \frac{n+2}{s+2}$$

>0

$E(\theta \mid \underset{\sim}{x})$

$$U(0,1) \equiv B(1,1)$$

$$f(x_1, x_2, \ldots, x_n \mid \theta)$$

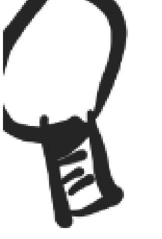
$$\boxed{\binom{n}{y} \theta^{y} (1-\theta)^{n-y}}$$

$$y = \sum_{i=1} x_i$$

$$\mathcal{L}(\theta) \equiv \mathcal{L}(\theta; y)$$

$$\theta^{y}(1-\theta)^{n-y}$$

$$\mathcal{L}(\theta) \propto_{\theta} f(\underline{x}|\theta)$$



A POSTERIORI

DE HOSE

DE HOJE

É A

PRIORI DE

AMANHÃ.

-  EM INF.

BAYESIANA

TODAS

AS

AS INFERÊNCIAS SÃO FEITAS A PARTIR DE $\mathcal{L}(\theta|\underline{x})$

PRINCÍPIO DE VEROSSIMILHANÇA

$$\mathcal{L}(\theta;\underline{x})$$

$$f(x_1, x_2, \dots x_n | \theta)$$

MODELLO

DATI x

PAR θ

STOPPING RULES