POSTERIOR TI(MIX) & P(M)
$$f(D|M)$$

$$H|X \sim N\left(\frac{\gamma^2 Z X_i + \sigma^2 \phi}{\eta \gamma^2 + \sigma^2} + \frac{\sigma^2 \gamma^2}{\eta \gamma^2 + \sigma^2}\right)$$

• PRIOR
$$\sigma^2 \sim \Gamma^{-1}(\alpha, \beta)$$
; $\Gamma(\sigma^2) = \frac{\beta^{\alpha}}{\Gamma(\alpha)}(\sigma^2)^{-1} \exp\left\{-\frac{\beta}{\sigma^2}\right\}$

$$\frac{1}{2} \left(\frac{1}{2} \right) \times \left(\frac$$

$$\alpha \left(\sigma^{2}\right)^{-\frac{N}{2}} \exp \left\{-\frac{\sum (x_{1}-M)^{2}}{2\sigma^{2}}\right\} \left(\sigma^{2}\right)^{-\frac{N}{2}} \exp \left\{-\frac{\beta}{\sigma^{2}}\right\}$$

$$\alpha \left(\sigma^{2} \right)^{-1/2} \exp \left\{ -\frac{1}{2} \right\}$$

$$\alpha \left(\frac{1}{2} \right) = \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right)$$

$$= (62)^{-(\frac{n}{2}+\alpha+1)} \exp \left\{-\frac{1}{62} \left[\frac{\Sigma(x;-\mu)}{2} + \beta\right]\right\}$$

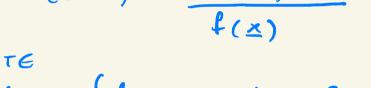
$$\frac{1}{2}(a_1)$$
 exp $\frac{1}{2}$

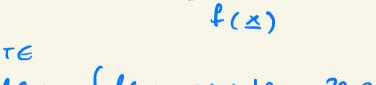
$$\frac{1}{2} | x \sim \Gamma \left(\frac{n}{2} + \alpha \right) \frac{\sum (x_1 - \mu)^2}{2} + \beta$$

$$= \frac{f(\underline{z}_{1},\underline{z}_{1})}{f(\underline{z}_{1},\underline{z}_{2})} = \frac{f(\underline{z}_{1},\underline{z}_{2})}{f(\underline{z}_{1},\underline{z}_{2})} = \frac{f(\underline{z}_{1},\underline{z}_{2})}{f(\underline{z}_{2},\underline{z}_{2})} = \frac{f(\underline{z}_{1},\underline{z}_{2})}{f(\underline{z}_{2},\underline{z}_{2})} = \frac{f(\underline{z}_{1},\underline{z}_{2})}{f(\underline{z}_{2},\underline{z}_{2})} = \frac{f(\underline{z}_{2},\underline{z}_{2})}{f(\underline{z}_{2},\underline{z}_{2})} = \frac{f(\underline{z}_{2},\underline{z}_{2})}{f($$

=> $\pi(\underline{\theta}|\underline{x}) = \frac{f(\underline{x}|\underline{\theta}) P(\underline{\theta})}{f(\underline{x})}$







· $f(x) = \int_{\Theta} f(x|\theta) P(\theta) d\theta$ PRUBLEMATIC!

• $P(\theta) = P(\theta_1, -1, \theta_n) - P(\theta) = \prod_{i=1}^{n} P(\theta_i)$

· P(Q | Ø) = TT P(O; |Ø) WHERE P(Ø)~f(D)

• π (θ | x) x f(x | θ) P(θ) THEN π(θ, ... θ, | x) HOW TO SUMMARISE ? THIS POSTERIOR?

$$TT(\theta_1|x) = \int T(\theta|x) d\theta_2 - d\theta_n$$
 of ten too complex

 $= \left[\prod_{n=1}^{\infty} \exp \left\{ -\frac{\left(\chi_{(-M)}^{n} \right)^{2}}{2\sigma^{2}} \right\} \left(2\pi r^{2} \right)^{2} \exp \left\{ -\frac{\left(n-p \right)^{2}}{2r^{2}} \right\} \frac{\beta^{n}}{\Gamma(d)} \left(\sigma^{2} \right) \exp \left\{ -\frac{\beta}{2r^{2}} \right\} \right].$

 $\alpha \left(\sigma^{2}\right)^{\left(\frac{1}{2}+\alpha+1\right)} \exp \left\{-\left[\frac{4x_{1}-x_{1}}{2\sigma^{2}}+\frac{(n-\alpha)^{2}}{2\sigma^{2}}+\frac{\beta}{\sigma^{2}}\right]\right\}$

$$\theta_1 | \times) = \int \Pi(\underline{\theta} | \underline{\xi}) d\theta_2 - d\theta_n$$
 of $\underline{\eta}$

· P. STERIOR TT (M, 02 (X) X (X) M, 02) P(M) P(02)



LET'S TRY SOMETHING ELSE => CONDITIONAL DISTRIBUTIONS

 $T(M|X,\sigma^2)$ $\propto \exp\left\{-\frac{1}{2}\left[\frac{\Sigma(x_i-M)^2}{\sigma^2} + \frac{(N-B)^2}{N^2}\right]\right\}^{-1}$ US BACK TO USE 1!

N(' ')

WHAT IF WE SET UP AN ITERATIVE PROCESS

WHICH SIMULATES FROM THESE CONDITIONAL DISTRIBUTIONS

IN TURN ?