My Presentation

Raja Ravi Kiran Reddy

IITH(AI)

July 3, 2021

$$\Sigma^{-1} = \frac{4\pi}{\lambda} \begin{pmatrix} \chi_1 & 0 & \cdots & 0 & 0 \\ 0 & \chi_2 & \cdots & 0 & 0 \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ 0 & 0 & \cdots & \chi_N & 0 \\ 0 & 0 & \cdots & 0 & 1 \end{pmatrix} \tag{1}$$

$$\boldsymbol{u} = [R_1, R_2, ..., R_N, \bar{A}_e] \in \mathbb{R}^{N+1} \tag{2}$$

$$p(\boldsymbol{u}|dM_1, ..., dM_N) \propto p(dM_1, ..., dM_N|\boldsymbol{u})p(\boldsymbol{u}) \tag{3}$$

$$p(\boldsymbol{u}) \propto exp\left(-\frac{1}{2}\boldsymbol{u}\Sigma^{-1}\boldsymbol{u}^{\top}\right) \tag{4}$$

$$\chi_i = \frac{1}{\binom{V_i}{2}} \sum_{k,j,k \neq j}^{\binom{V_i}{2}} \left(dR_{kj_i} - \frac{\lambda}{4\pi} d\phi_{kj_i} \right)^2 \tag{5}$$

$$p(dM_1, ..., dM_N|\boldsymbol{u}) \propto exp\left(-\frac{\sum_{i=1}^{N}\left(dM_i - \hat{m}_i(\boldsymbol{u})\right)^2}{2\sigma^2}\right) \tag{6}$$

$$\mathcal{L}(\boldsymbol{u}) \propto -\frac{\sum_{i=1}^{N}\left(dM_i - \hat{m}_i(\boldsymbol{u})\right)^2}{2\sigma^2} + \boldsymbol{u}\Sigma^{-1}\boldsymbol{u}^\top \tag{7}$$

$$\hat{m}(\boldsymbol{u}) = \hat{m}(\boldsymbol{u}_0) + \boldsymbol{D}(\boldsymbol{u} - \boldsymbol{u}_0) \tag{8}$$

$$
\boldsymbol{D} = \begin{pmatrix} -\frac{\sqrt{\bar{A}_e}}{R_1^2} & \frac{\sqrt{\bar{A}_e}}{R_1 R_2} & \cdots & \frac{\sqrt{\bar{A}_e}}{R_1 R_N} & \frac{1}{2R_1\sqrt{\bar{A}_e}} \\ \frac{\sqrt{\bar{A}_e}}{R_2 R_1} & -\frac{\sqrt{\bar{A}_e}}{R_2^2} & \cdots & \frac{\sqrt{\bar{A}_e}}{R_2 R_N} & \frac{1}{2R_2\sqrt{\bar{A}_e}} \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ \frac{\sqrt{\bar{A}_e}}{R_N R_1} & \frac{\sqrt{\bar{A}_e}}{R_N R_2} & \cdots & -\frac{\sqrt{\bar{A}_e}}{R_N^2} & \frac{1}{2R_N\sqrt{\bar{A}_e}} \end{pmatrix} \tag{9}
$$

$$\mathcal{L}' = \frac{1}{2}\boldsymbol{x}\boldsymbol{A}\boldsymbol{x}^\top - \boldsymbol{b}\boldsymbol{x} \tag{10}$$

$$\boldsymbol{x} = \boldsymbol{u} - \boldsymbol{u}_0 \tag{11}$$

$$\boldsymbol{A} = \Sigma^{-1} - \frac{\boldsymbol{D}\boldsymbol{D}^\top}{\sigma^2} \tag{12}$$

$$\boldsymbol{b} = \boldsymbol{D}\frac{(m(\boldsymbol{u}) - \hat{m}(\boldsymbol{u}))}{\sigma^2} + \Sigma^{-1}\boldsymbol{u}_0 \tag{13}$$

$$p(x, y, z, s|\boldsymbol{u}) \propto p(\boldsymbol{u}|x, y, z, s)p(x, y, z, s) \tag{14}$$

$$(x - x_i)^2 + (y - y_i)^2 + (z - z_i)^2 = sR_i^2, \quad i = 1, ..., N \tag{15}$$

$$v_{x_i}^2 + v_{y_i}^2 + v_{z_i}^2 = \left(\frac{\frac{\lambda}{4\pi} d\phi_{t,t-1}}{dt} \right)_i^2, \quad i = 1, ..., N \tag{16}$$