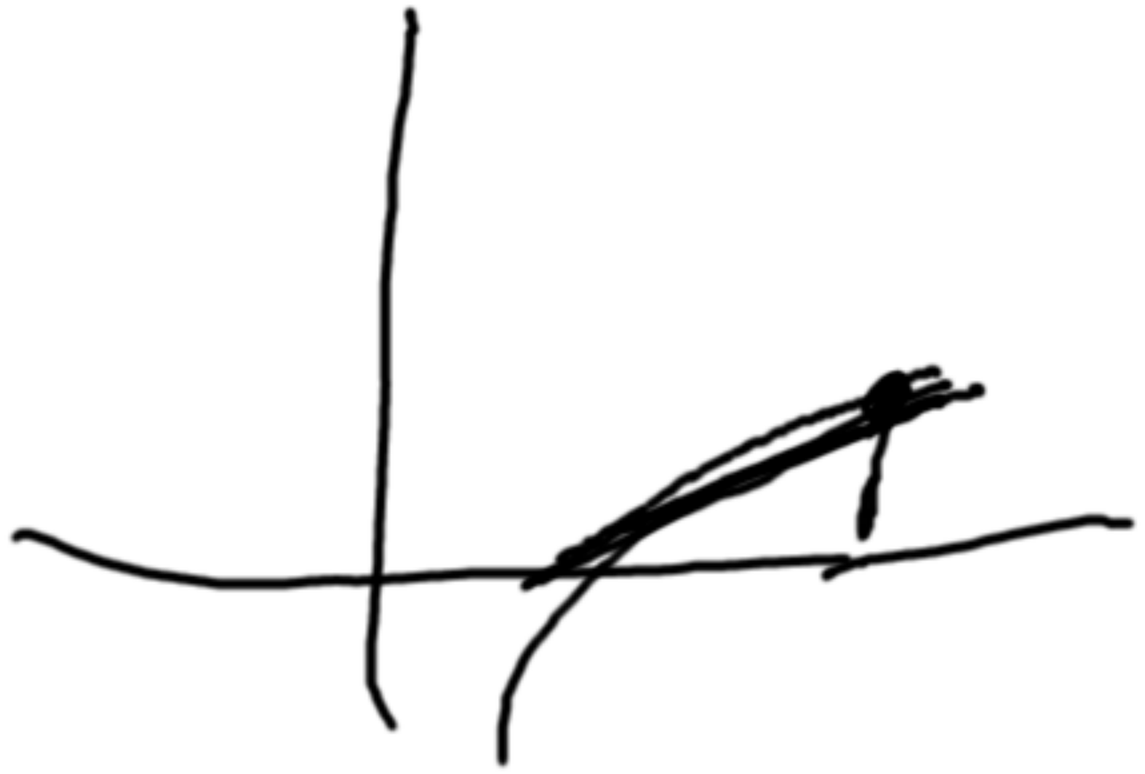

$f(x_0)$, $f'(x)$

want $x : f'(x) = 0$

$$x = x_0 - \frac{f(x_0)}{f'(x_0)} \Rightarrow x_1 \Rightarrow x_0 - \frac{f'(x_0)}{f''(x_0)}$$

multi dimensions: $x_1 \Rightarrow x_0 - (f'')^{-1} f'$

$$\chi^{2\prime} = -2 A_m^T N^{-1} (d - A(m)) = -2 A_m N^{-1} r \qquad r = d - A(m)$$

$$A_m = \frac{\partial A}{\partial m}$$

$$\nabla\nabla = 2 A_m^T N^{-1} A_m$$

$$dm = (A_m^T N^{-1} A_m)^{-1} (A_m^T N^{-1} r) \Rightarrow A_m^T N^{-1} A_m m = A_m^T N^{-1} r$$

$|\delta\chi^2| \gg 1 \Rightarrow$ statistical significance

$|\delta\chi^2| \ll 1 \Rightarrow$ no significant difference

if Newton/LM $\Rightarrow |\delta\chi^2| \ll 1$, we can probably stop

also want to check that $\delta m \ll \sigma_m$

$$\sigma_m = \sqrt{\mathrm{diag}\,(A^T N^{-1} A)^{-1}}$$

$\langle x \rangle$

$$\langle x \rangle = \frac{\int L(x)\, x\, dx}{\int L(x)\, dx}$$

$$\sigma(\bar{x}) \rightarrow \bar{x} = \frac{\sum x_i}{n}$$

$\mathrm{Var}(A+B) = \mathrm{Var}(A) + \mathrm{Var}(B)$ if A, B uncorr

$$\mathrm{Var}(\bar{x}) = \frac{\mathrm{Var}(x_i) \cdot n}{n^2}$$

$$\mathrm{Var}(\bar{x}) = \frac{\mathrm{Var}(x_i)}{n} \qquad \sigma(\bar{x}) = \frac{\sigma(x_i)}{\sqrt{n}}$$

Convergence: If I have many independent chains

σ(mean) between chains $< \xi\, \sigma_{\text{within chain}}$