Additional Slides

Group-12

SNR After Filtering

Cost Function	NLMS (dB)	RLS (dB)	Quasi-Newton (dB)
MSE	9.593	22.3	24.86
log-cosh	22.3006	22.43	24.91
WLS	10.4	12.25	22.3057

Table: SNR comparison after filtering using different cost functions and algorithms.

Newton's Method: System Solving vs Optimization

Second-order Taylor Expansion:

$$f(x + \Delta x) \approx f(x) + \nabla f(x)^T \Delta x + \frac{1}{2} \Delta x^T H(x) \Delta x$$

Set the derivative to 0: $\nabla f(x) + H(x)\Delta x = 0$

$$\Rightarrow \quad \Delta x = -H(x)^{-1} \nabla f(x)$$

Newton's update: $x_{k+1} = x_k - H(x_k)^{-1} \nabla f(x_k)$