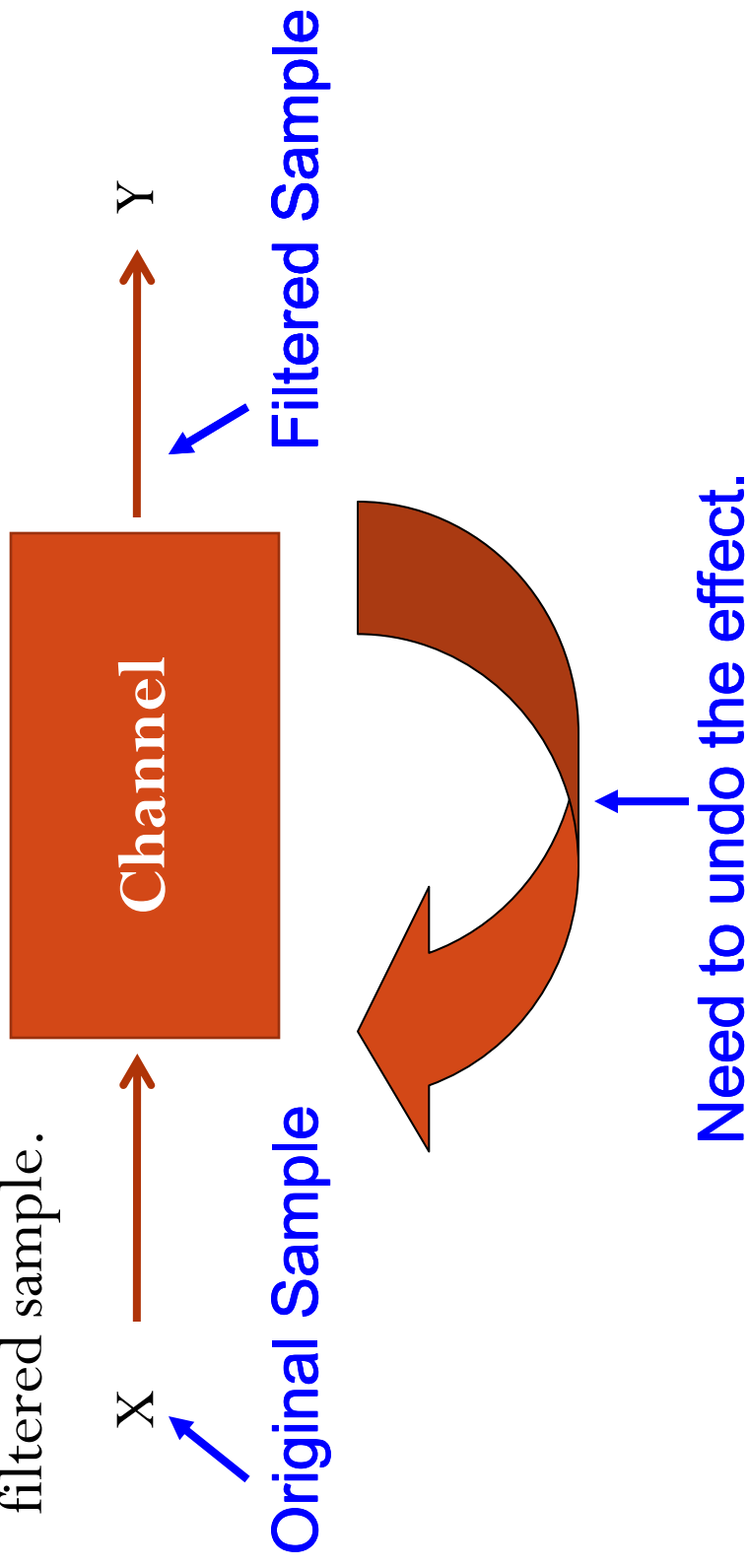


EE4810 DSP Final Project
Channel Equalization

Po-Han Huang
Abhinandan Majumdar

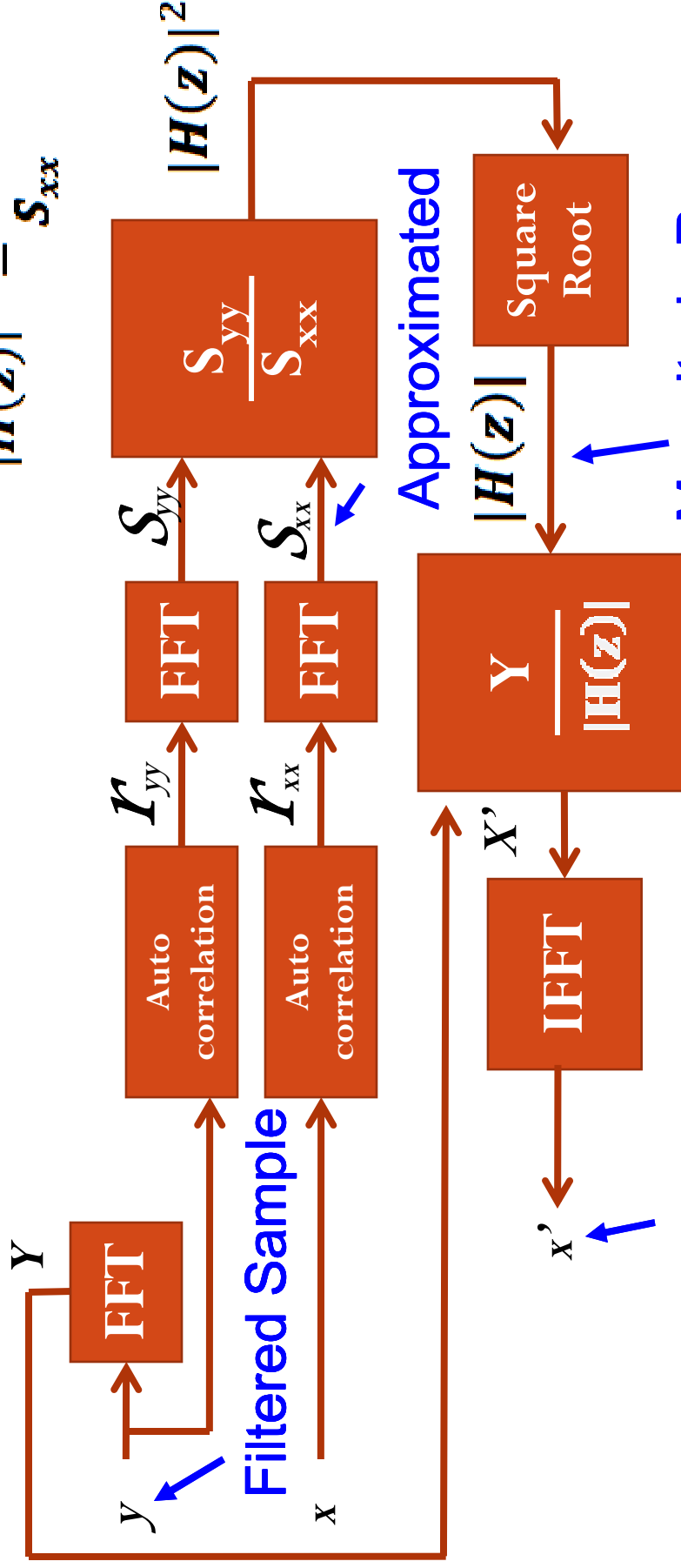
Channel Equalization

- The input signal X underwent unwanted filtering after being passed through unknown channel.
- The objective is to regenerate the original sample from the filtered sample.



Algorithm

$$|H(z)|^2 = \frac{S_{yy}}{S_{xx}}$$



Magnitude Response of Channel

Original Sample (Regenerated)

$$|X|e^{j\theta_x} \times |H|e^{j\theta_H} = |Y|e^{j\theta_y} \longrightarrow |X| \times |H| = |Y|$$

$$\theta_x + \theta_H = \theta_y$$

Has to be Linear or Zero to make generated sample audible.

Result

- Original Sound.
- Sound passed through Linear filter.
- Sound passed through Zero phase filter.
- Sound we got by having the original sound for S_{xx} .
- Sound we got by guessing the original sound for S_{xx} .

Conclusion & Future Work

- This approach is limited only for linear / zero phase filters as it needs lot of approximation in guessing the right phase changes being introduced by filter channel.
- Also, this approach needs approximation on S_{xx} value. Generally, this value is similar for different speech samples but this might add noise in the generated sample.