Istanbul Technical University
Faculty of Computer and Informatics
Computer Engineering Department

BLG 354E
Signals & Systems for Computer Engineering
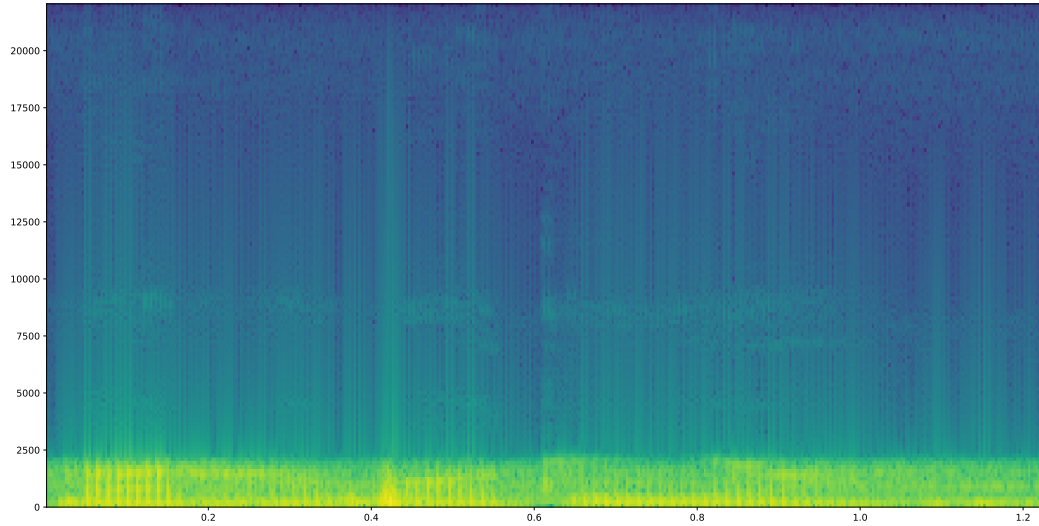Homework IV

Uğur Uysal - 150140012

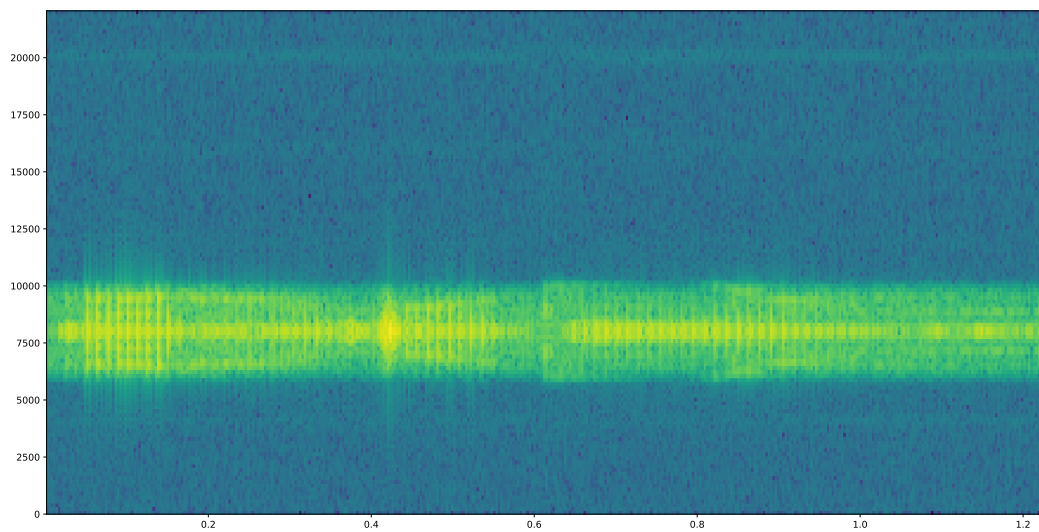June 3$^{\text{rd}}$, 2018

Contents

1 Question I

1.1 Signal Only Filtered
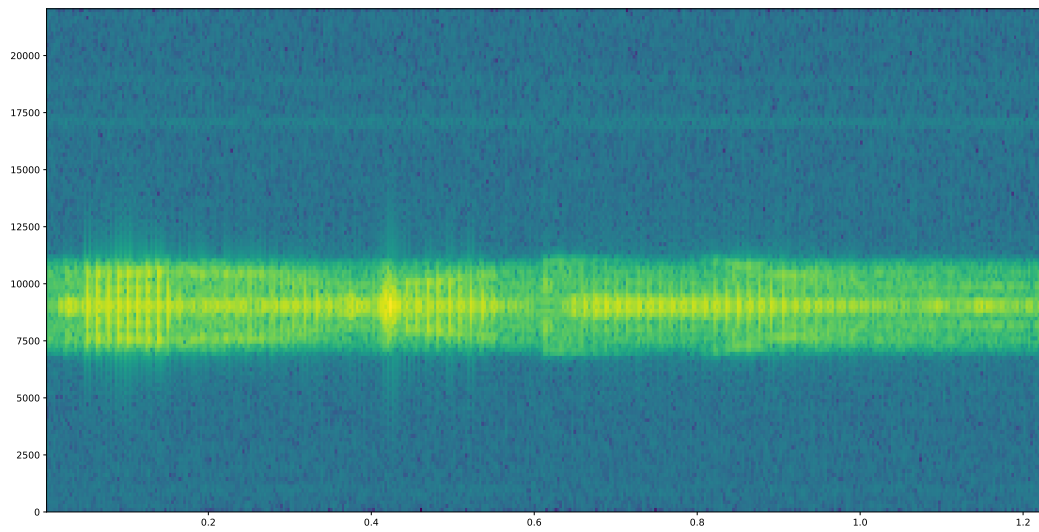
Figure 1: Spectogram after filtering

1.2 modulation
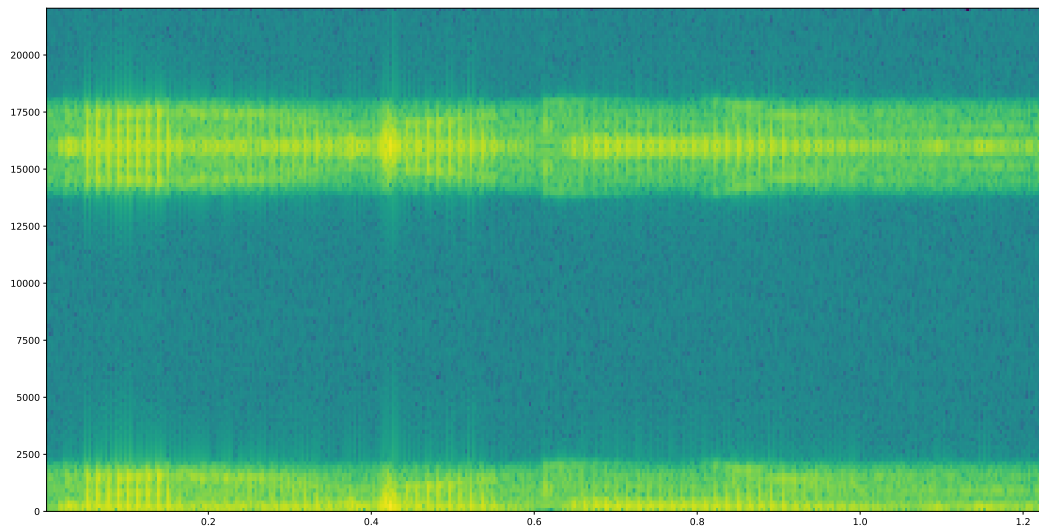
Figure 2: Modulation spectrum with 8kHz
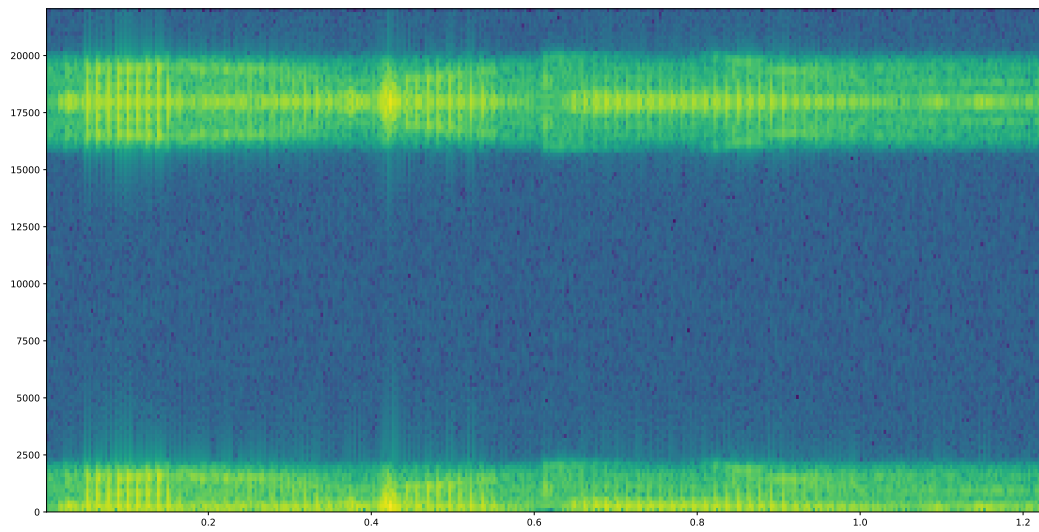
Figure 3: Modulation spectrum with 9kHz

1.3 Demodulated Spectrums

Figure 4: Demodulation spectrum with 8kHz

**Figure 5:** Demodulation spectrum with 9kHz

1.4 Effect of Phase

Phase affects the amplitude of the demodulated signal. I was able to obtain the zero output.

Hence, a phase error of ϕ radians results in the demodulated amplitude being scaled by $cos\phi$. This scaling is problematic: if we were unlucky enough to have the error close to $\pi/2$, then we would see almost no output at all from. (From MIT Course Notes)

Figure 6: Phase Effect Zero Output
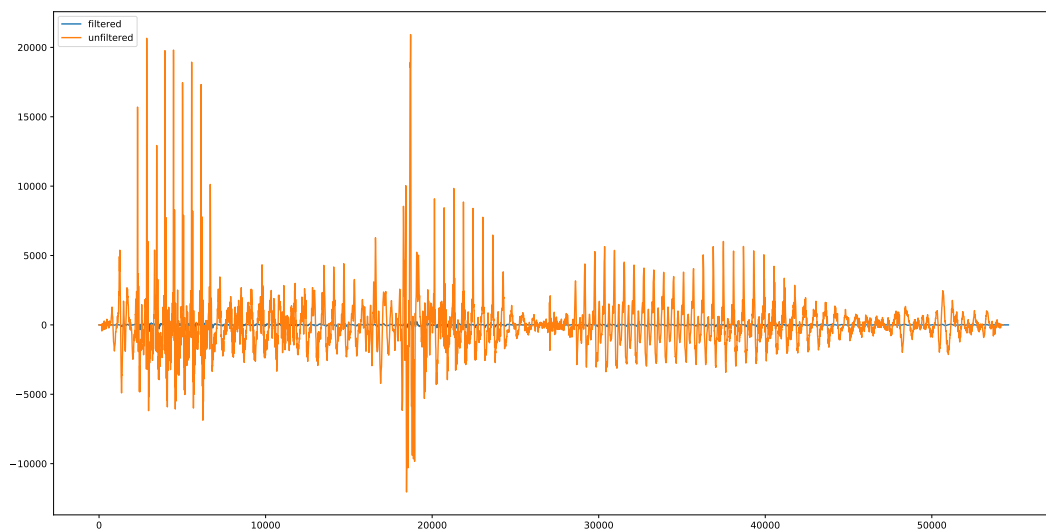
Figure 7: Phase Effect Amplitude Changes
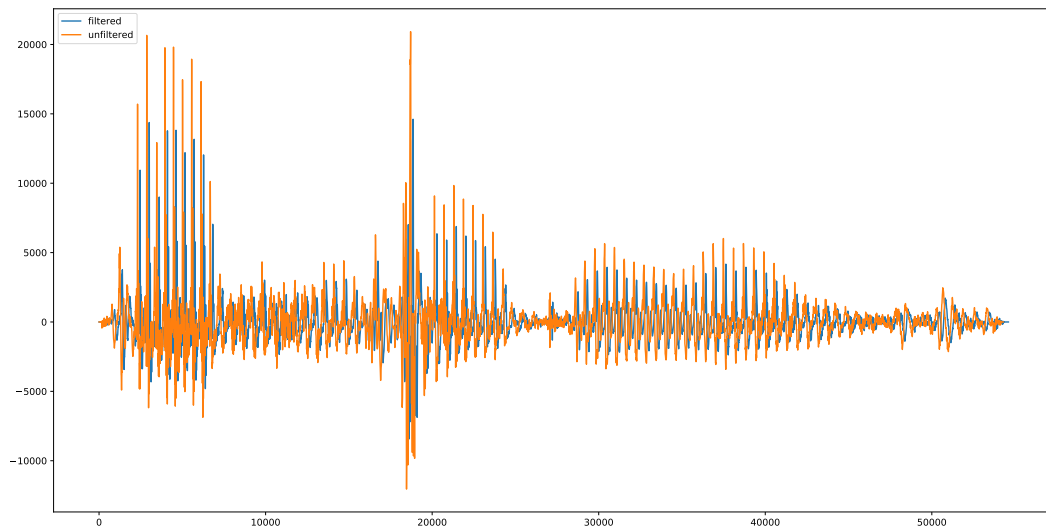
1.5 Zero Phase and Demodulation With Different Frequency

It changed the audio. It sound like more robotic. I don't know any other effects.