

Introduction to the Signal Processing Bachelor

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Agenda



Signal Processing

Søren and Jacob

Frequency Domain Analysis

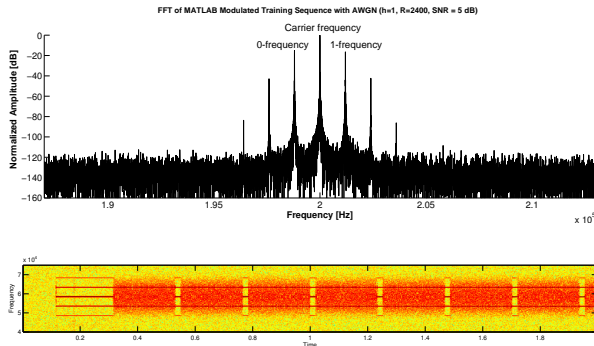
FSK Modulation and Fourier Transformation



Signal Processing

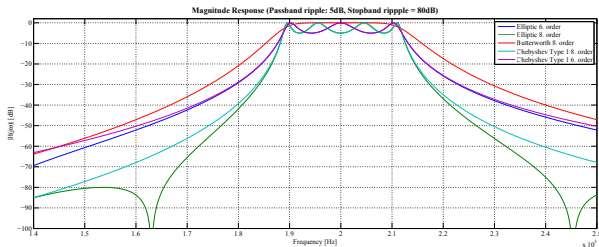
Søren and Jacob

Satellite Simulation and Recordings



- ▶ Estimating carrier frequency.
- ▶ Errors at low frequency in windmill.
- ▶ Estimation of noise.

Filter Design Specs



- Doppler Shift Range.
- Speech Area.

Filter Implementation

From s-domain to z-domain



Signal Processing

Søren and Jacob

Filter Design Specs

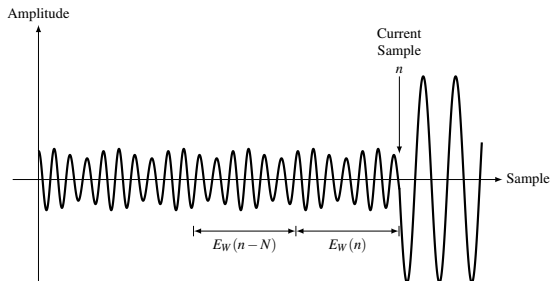
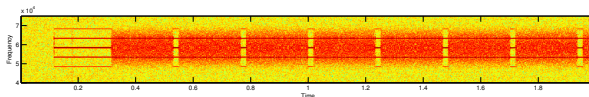
```
w1n = ((xn<<15) - coeff[3]*w1n1 - coeff[4]*w1n2)    >> 15;  
y1 = (coeff[0]*w1n + coeff[1]*w1n1 + coeff[2]*w1n2) >> 15;
```

```
A1  = R0.L * R1.L, A0 = R0.L * R1.H    || R3 = [P0+4];  
R0.H = (A1 -= R2.L * R7.L), A0 -= R2.H * R7.L || R4 = [P0+8];
```

```
A1  = R0.L * R3.L, R2.L = (A0 -= R0.H * R3.H);  
R2.H = (A1 -= R0.H * R4.L) || R1 = [P0+12];  
M0 = R2;
```

- Implementing in C and Assembly (z-domain).

Packet Detection & Time Synchronization



- Could also be for localization of speech.