



The Hilbert Transform

This presentation introduces the Hilbert Transform and applications for its use. The basic theoretical background of the Hilbert Transform is introduced. The mathematical definition is presented along with some simple graphical tools for its understanding and use. The concept of the Analytic Signal is introduced and two additional properties – the Envelope and the Instantaneous Frequency are described. Examples of the practical use of these functions are demonstrated, with emphasis on acoustical applications. Usage of the corresponding Matlab function is also shown. References for additional detailed information are provided.

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Course Outline

- **Definition**
 - Time Domain
 - Frequency Domain
- **Analytic Signals**
- **Simple Example: $\sin x$**
- **Applications**
 - Envelope Extraction
 - Decay Time Estimations
 - Propagation Delay / Signal Arrival Estimation
 - All Pass / Minimum Phase System Separation
- **MatLab Usage**
- **Conclusion**