Example of Video Transcriptions for Course 100: Principles of Audio

The Time Domain Overview

1. Audio and Acoustic Waves
2. Piston Source
3. Wave Analysis
4. Functions
5. Voltage
6. The Time Record
7. The Sine Wave
8. Putting It All Together
9. Loudspeakers as Pistons
10. Sines, Cycles, and Circles
11. Time and Frequency
12. Harmonics
13. Superposition
14. Phase Relationships
15. The Square Wave
16. Audio and Acoustic Superposition

100_10 the Time Domain – Clip 1

1. Audio and Acoustic Waves – 00:08

Audio signals are electrical waves that travel down cables and through components. They propagate at nearly the speed of light, and they must be observed with instrumentation. Acoustic waves are chain reaction vibrations that travel through the air around us. They propagate at the speed of sound. Sound is what happens when air gets pushed. The ear-brain system is a transducer that senses acoustical signals and converts them to electrical signals that are sent to the brain for further processing.

2. Piston Source – 00:51

As a visual aid, consider a piston driving the air in a tube. The stroke produces a train of pressure waves that travel down the tube at the speed of sound. We will assume that the tube is either infinitely long, or terminated with an absorber. Both have the same effect in that no reflected waves return to the source. The terms “terminate” and “absorb” will come up again in future lessons on interfaces. Confining the waves to a tube makes them easier to analyze. In later lessons will consider the spreading behavior of waves in a free field.

3. Wave Analysis – 01:34

There are several frames of reference used to analyze waves and their behavior. One of these is the time domain, which answers the question “When?” Another is the frequency domain which answers the question “How often?” and a third is wavelength, which answers the question “How big?” In short, I need to know when signal arrives, the response of the signal that does arrive, and if I'm working with acoustics, the physical size of the waveform, since it will interact with the room and things in it. Wave investigations require a knowledge of time, frequency, and wavelength. In sound system work, we make audio measurements of the signal chain and…