F-AKU8: Calculating the phase of an acoustical signal from its time frequency representation

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The phase information of acoustic signals is often disregarded or ignored and only the amplitude information is used respectively interpreted. While this has a psychoacoustical reason for harmonic and stationary sound, it is no longer valid for transients and signals with time-varying frequencies. For these signals the phase information is perceptually relevant.
Calculating the phase of the signal from its time-frequency coefficients must be done carefully, while the amplitude information is more easily available. There are some basic "specialties" of the phase, which must be considered. Without this special care the phase information, especially in a "phasogram", a time-frequency representation of the phase, is very hard to interpret.
In this talk we will give an introduction to the basic properties of the phase, we will show in an acoustic example, that (depending on the parameters of the transformation) there can be a lot of relevant information in the phase. We will look at the basic mathematical background and will talk about possible solutions for some of the problems. We will look both at the Gabor and the wavelet case and will show that in the wavelet case some problems are avoided and the phase information can be used to detect abrupt changes in signals. We will show how to adapt the Gabor (STFT) transformation to get better results and to implement a phasogram, which can be more easily interpreted.

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