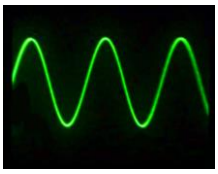
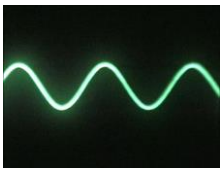
Sound signals and sound curves

Periodic sound signals

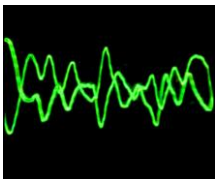
A pure tone is the physically most simple type of sound signal. It corresponds to a pure-frequency, periodic sine wave (= harmonic vibration). Thus, the basic pattern is repeated in periodic sound signals (for example, the continuous tone of a musical instrument or singer).



As “pure tones”, single periodic tones contain only one single frequency (mono-frequency sinus tone). This occurs only as a synthetically produced “test tone” in metrology.



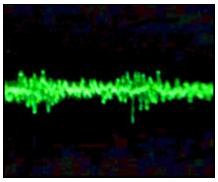
Single periodic tones are produced also by tuning forks; although strictly speaking, these tones are not really pure because they contain overlapping overtones. Of all non-synthetic sources of sound, tuning forks come closest to the ideal of a mono-frequency sinus tone.



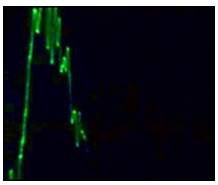
In complex periodic tones, several single tones mix together to form a “combined tone” (sound).
In violins, for example, the overlapping tones and sounds of several strings together form a “mixture of tones and sounds”. The effect is a complex periodic sound signal, formed by a combination of single partial tones.

Aperiodic sound signals

Aperiodic sound signals are composed of numerous individual vibrations whose frequencies are not integrally correlated with each other. Examples include pulse-like sound signals such as shots, slamming doors, and noise from machines or cars.



Noise is defined as a sound event with an uneven (= aperiodic) vibration form.
Examples include rustling paper or traffic noise.



A bang is caused by a sudden mechanical, aperiodic vibration with a large amplitude of very short duration. In addition, the amplitude diminishes very quickly.
Examples of such phenomena are shots, the bursting of a paper bag or the slamming of a door.

Most sound signals in our daily lives are not composed of single tones, but consist of several different frequencies; i.e., these signals are complex sound signals often containing superimposed aperiodic components.