Claims

1. A method for operating a piezoelectric speaker for generating sound waves in the audible wavelength spectrum and/or in the ultrasonic range, the method comprising:

   at least partially charging a piezo actuator of the piezoelectric speaker with electrical energy from an energy unit and then at least partially discharging the piezo actuator so as to generate a sound wave;

   wherein when charging the piezo actuator, the electrical energy from the energy unit is first charged to a transfer charging unit and then transferred from the transfer charging unit to the piezo actuator;

   determining at least one present electrical piezo actuator voltage of the piezo actuator;

   performing a comparison of a future input voltage for the piezo actuator with the present electrical piezo actuator voltage prior to charging and/or discharging; and

   deriving a first future differential voltage from the comparison.

2. The method according to claim 1, wherein the future input voltage of the piezo actuator is derived from an audio signal intended for outputting at the piezoelectric speaker.

3. A method for operating a piezoelectric speaker for generating sound waves in the audible wavelength spectrum and/or in the ultrasonic range, the method comprising:

   at least partially charging a piezo actuator of the piezoelectric speaker with electrical energy from an energy unit and then at least partially discharging the piezo actuator so as to generate a sound wave;

   wherein when discharging the piezo actuator, the electrical energy is first charged from the piezo actuator to the transfer charging unit and then transferred from the transfer charging unit to the energy unit;

determining at least one present electrical piezo actuator voltage of the piezo actuator;

performing a comparison of a future input voltage for the piezo actuator with the present electrical piezo actuator voltage prior to charging and/or discharging; and

deriving a first future differential voltage from the comparison.

4. The method according to claim 1, further comprising the step of using the first future differential voltage as the basis for deriving a second future differential electrical energy for charging the piezo actuator.

5. The method according to claim 1, further comprising the step of using the measured piezo actuator voltage as the basis for deriving a second future differential electrical energy.

6. The method according to claim 1, further comprising the step of determining a future charging time during which the electrical energy is charged from the energy unit into the transfer charging unit wherein the future charging time depends on the future differential energy, the future differential voltage, and/or the measured piezo actuator voltage.

7. The method according to claim 1, further comprising the step of determining a future discharging time during which the electrical energy is charged from the piezo actuator to the transfer charging unit wherein the future discharging time depends on the future differential energy, the future differential voltage, and/or the measured piezo actuator voltage.

8. The method according to claim 6, further comprising the step of saving the charging time in a memory unit wherein the charging time is determined based on the future input voltage, the present piezo actuator voltage, the future differential voltage.

9. The method according to claim 7, further comprising the step of saving the discharging time in a memory unit wherein the discharging time is determined based on the future input voltage, the present piezo actua-

tor voltage, the future differential voltage, and the future differential energy.

10. The method according to claim 1, wherein the charging and/or the discharging of the piezo actuator is performed by means of a pulse-width-modulation method.

11. The method according to claim 1, wherein the charging, the discharging, and/or the deriving of the differential voltage, the differential energy, the charging time, or the discharging time, and/or the determining of the piezo actuator voltage is performed incrementally.

12. The method according to claim 1, wherein the charging, the discharging, and/or the deriving of the differential voltage, the differential energy, the charging time, or the discharging time, and/or the determining of the piezo actuator voltage is performed periodically at a working frequency.

13. The method according to claim 1, wherein a period (P1-P6) of the working frequency is divided into a first span of time, into a second span of time subsequent to the first span of time, and into a third span of time subsequent to the second span of time.

14. The method according to claim 13, wherein the electrical energy is charged from the energy unit to the transfer charging unit in the first span of time, wherein the charging of the transfer charging unit from the energy unit takes place at a point in time such that the differential energy is stored in the transfer charging unit at the end of the first span of time.

15. The method according to claim 13, wherein the charging or discharging of the piezo actuator begins at the beginning of the second span of time.

16. The method according to claim 13, wherein the piezo actuator voltage is measured, the differential voltage, the input voltage, or the difference energy is derived, and/or the piezo actuator is discharged in the third span of time.

17. A circuit for operating a piezoelectric speaker for generating sound waves in the audible wavelength spectrum and/or in the ultrasonic range, a piezo actuator of the piezoelectric speaker being able to be charged and/or discharged by means of the circuit, such that deflections of the piezo actuator can be shaped such that the sound waves can be generated, electrical energy being able to be charged between an energy unit and the piezo actuator by means of the circuit, wherein the circuit is configured for operating the piezoelectric speaker according to a method comprising the following steps:

at least partially charging a piezo actuator of the piezoelectric speaker with electrical energy from an energy unit and then at least partially discharging the piezo actuator so as to generate a sound wave;

wherein when charging the piezo actuator, the electrical energy from the energy unit is first charged to a transfer charging unit and then transferred from the transfer charging unit to the piezo actuator;

determining at least one present electrical piezo actuator voltage of the piezo actuator;

performing a comparison of a future input voltage for the piezo actuator with the present electrical piezo actuator voltage prior to charging and/or discharging; and

deriving a future differential voltage from the comparison.