However, typical reference voltage sources only achieve an accuracy in the order of magnitude of 50ppm per year, for example. Due to the quadratic dependence of the scale factor on the reference voltage, this already results in a change in the scale factor of 100ppm per year. If the aging effects of other components are also taken into account, this results in a drift of the scale factor, and thus of the measured values, of at least 300ppm per year for a typically implementable acceleration sensor. This also influences the accuracy of the measurement via the offset/bias of the sensor up to values of 50 to 100μg, which is too much for a high-precision acceleration sensor without correction.

The inaccuracies of other electronic components that occur over time can also be estimated in a similar way. Here, too, the temporal drift of reference voltages is often mainly responsible for the drift of the overall component.

In this process, improvement of the accuracy of reference voltage sources is not possible or only possible in a complicated way. In addition, there is the problem that the direct measurement of the reference voltages is afflicted with a similar temporal drift or intrinsic measurement inaccuracy, which is similar in magnitude to the drift of the reference voltage.

Embodiments of the present invention provide a method for measuring a voltage, in particular a reference voltage, which is sufficiently accurate to detect the long-term drift of the voltage. Embodiments of the present invention provide a device which can implement such a method.

According to a first aspect of the present invention, there is provided a method for measuring a voltage by means of a micro-electro-mechanical system, MEMS, including a sample mass which is mounted above a substrate by means of mechanical spring elements in such a way that it can be moved relative to the substrate along a direction of vibration, trim electrodes which are suitable for generating an electrostatic force on the sample mass when a voltage is applied to them, the electrostatic force counteracting a mechanical spring force generated by the spring elements when the sample mass is deflected along the direction of vibration, drive electrodes which are suitable for setting the sample mass in motion along the direction of vibration, and readout electrodes which are suitable for measuring a vibration frequency of the vibration of the sample mass generated in such a way, wherein the method includes: applying a voltage to be measured to the trim electrodes; measuring the magnitude of the voltage to be measured from the measured vibration frequency of the sample mass;

and detecting changes in the voltage to be measured on the basis of the change in the measured vibration frequency characterized in that the voltage to be measured is a reference voltage, the magnitude of which is the basis for further measurement and/or calculation operations; and the method further includes: correcting the further measurement and/or calculation operations by replacing the anticipated reference voltage with the measured reference voltage.

According to a second aspect of the present invention, there is provided a micro-electro-mechanical system, MEMS, for measuring a voltage, including: a sample mass which is mounted above a substrate by means of mechanical spring elements in such a way that it can be moved relative to the substrate along a direction of vibration; trim electrodes which are suitable for generating an electrostatic force on the sample mass when a voltage is applied to them, the electrostatic force counteracting a mechanical spring force generated by the spring elements when the sample mass is deflected along the direction of vibration; drive electrodes which are suitable for setting the sample mass in motion along the direction of vibration, and readout electrodes which are suitable for measuring a vibration frequency of the vibration of the sample mass generated in such a way; and a control unit which is suitable for controlling the MEMS in such a way that it carries out the above method.

According to a third aspect of the present invention, there is provided an acceleration sensor for measuring acceleration, including: the above system, wherein the MEMS is suitable for measuring an acceleration that acts on the acceleration sensor along the direction of vibration of the sample mass by measuring the vibration frequency of the sample mass.

In particular, a method for measuring a voltage uses a micro-electro-mechanical system, MEMS. The MEMS has a sample mass which is mounted above a substrate by means of mechanical spring elements in such a way that it can be moved relative to the substrate along a direction of vibration, trim electrodes which are suitable for generating an electrostatic force on the sample mass when a voltage is applied to them, the electrostatic force counteracting a mechanical spring force generated by the spring elements when the sample