

COMMON MODE NOISE REDUCTION DEVICES AND METHODS FOR BIOPOTENTIAL ACQUISITIONS

Technology for Licensing

Keywords:

Evoked potential, biopotential, common mode rejection, bioamplifier, instrumentation amplifier; differential amplifier

Description:

The signal quality produced by biopotentials, such as evoked potentials, electrocardiograms, etc., is greatly affected by common mode noise from both external (mains interference) and internal (other background biopotentials) sources. This noise is lower if the measurement is carried out in a screened room with devices integrating low noise differential amplifiers and high noise rejection ratio, using electrodes with low contact impedance. However, these solutions are costly and difficult to implement.

This invention involves a device capable of collecting signals corresponding to all types of biopotentials, reducing the common mode noise that affects the quality of these signals. The electronic circuit of this device has two amplifiers, where the first amplifies the differential signal recorded by the electrodes, while the second amplifies an estimate of the common mode signal. The system combines both signals, applying a gain to the common-mode signal determined either manually or automatically, so that the optimal combination provides the signal of interest where common-mode noise has been significantly reduced, avoiding the use of subcutaneous electrodes and shielded rooms to reduce electromagnetic interference.

Compared to other solutions, the device is presented as a low production cost tool, easily transportable, which allows to record any type of biopotential quickly, easily and non-invasively, and improves the quality of the recorded signals.

A device and several application methods have been developed to reduce/eliminate electrical noise in common mode in the acquisition of electrical signals generated by biological systems (biopotential). The device, easily adaptable to any type of biopotential register, tolerates the unbalance in the contact impedances of the measuring electrodes and also allows taking such measures without the need for costly installations (such as screened rooms).

Advantages and Benefits

- » Quickly and easily record robust biopotentials on common mode noise.
- » Non-invasive solution.
The device configuration removes impedance balancing and thus the need for needle electrodes.
- » Low production cost.
- » Reduced time and cost of medical examination.
Due to the reduction of common mode noise, less averaging is needed during evoked potential testing without the use of shielded rooms.
- » Adaptable to all types of biopotential acquisition systems.
Such as evoked potentials, electromyography, electroencephalography, electrocardiography, etc.

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Contact:

Oficina de Transferencia de Resultados de Investigación
(OTRI) - Universidad de Granada

patentes@ugr.es

www.otri.ugr.es