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Non-Conventional Mobile Phone Charger

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ABSTRACT. *This paper details about the usage of one of the most commonly available electric source for charging the Lithium Battery of our Mobile Phones and Smart phones. The energy source said above is the Electric Potential that is available in the human body. It is possible to recover these human electric potentials and to use it in a useful way. As the intensity of the Electric potential that is available at the out surface is much less, it is not possible to use it for wide range of applications. Through this thesis, I have revealed my idea of using such human Electric Potential to recharge a Lithium Battery of a Mobile phone in a conventional manner.*

Keywords: Biometric signals, Op-Amp, Skin Electrode

1. **Introduction.** Our earth is a source for a wide range of energy sources. We normally use conventional sources of energy for our day to day utilities of life. But on considering the reduction in the level of conventional energy sources, we are in the need to replace these sources with an alternative. This paper will be a alternative approach on one of the common device which we use every day in our life. The development in the field of communication technology has led to the wide usage of mobile phones, which has a tremendous impact in our day to day life. In fact, we may be empty, if we don't have mobile phones today. The usage of increase in the usage of mobile phones over the years has revealed us its impact on human society.

Thought it is good to see this tremendous impact, we have to note that with the increase of the ratio of usage of mobile phones, the usage of mobile phone charger indirectly increases. Though the amount of power consumed by these chargers is considerably less, on the whole its power consumption figures will be very high. In order to solve this issue, we are in the need to search for an alternative source. Through this paper I propose a model to an alternative approach to recharge our mobile phone battery.

Through this thesis, we have proposed a new model to recharge our mobile phones. It is by using the human electric potential available at the various parts of the body due to the internal working of various parts of the body. It is possible to recover these signals which are of very low amplitude, and then to amplify these signals using the amplifier circuits, and then they can be converted into DC, which can be used to recharge our mobile phones. Thus, this paper will give an insight to the usage of human electric potential in an effective manner, so as this could be a initiative for further more projects.

2. **Existing System.** Normally our mobile phone chargers produce 5V DC output, which is fed to the mobile phones to recharge the lithium battery. As our plug points are readily available with 230V AC supply, the adopter of the charger is provided with a transformer, and rectifier circuit so as to produce the desirable output.

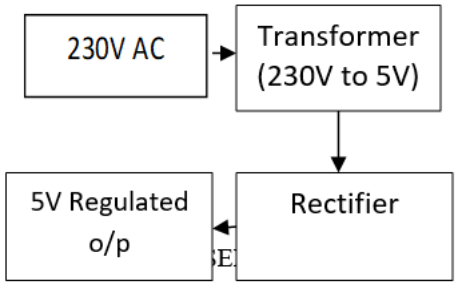

Fig1. Flow chart of Existing System

3. **Proposed Model.** Our human body can be rightly said as a complicated device. It is now well established that the human body, which is composed of living tissues, can be considered as a power station generating multiple electrical signals with two internal sources, namely muscles and nerves. Normal muscular contraction is associated with the migration of ions which generates potential differences measurable with suitably placed electrodes. For example. The heart and the brain produce characteristics patterns of voltage variations which when recorded and analyzed are useful in both clinical practice and research.

Potential differences are also generated by the electrochemical changes accompanied with the conductions of signals along the nerves to or from the brain. These signals are of the order of a few micro volts and give rise to a complicated pattern of electrical activity, when recorded. Bioelectric potentials are generated at a cellular level and the source of these potentials is ionic in nature. A cell consists of an ionic conductor separated from the outside environment by a semi permeable membrane which acts as a selective ionic filter to the ions. This means that some ions can pass through the membrane freely whereas others cannot do so. All living matter is composed of different types. Human cells may vary from 1 micron to 100 microns in diameter, from 1mm to 1m in length, and have a typical membrane thickness of 0.01 microns. Thus these electric potential due to ions is available

at the outermost surface of the body. Our wrist being the points where we can notice the pulses.

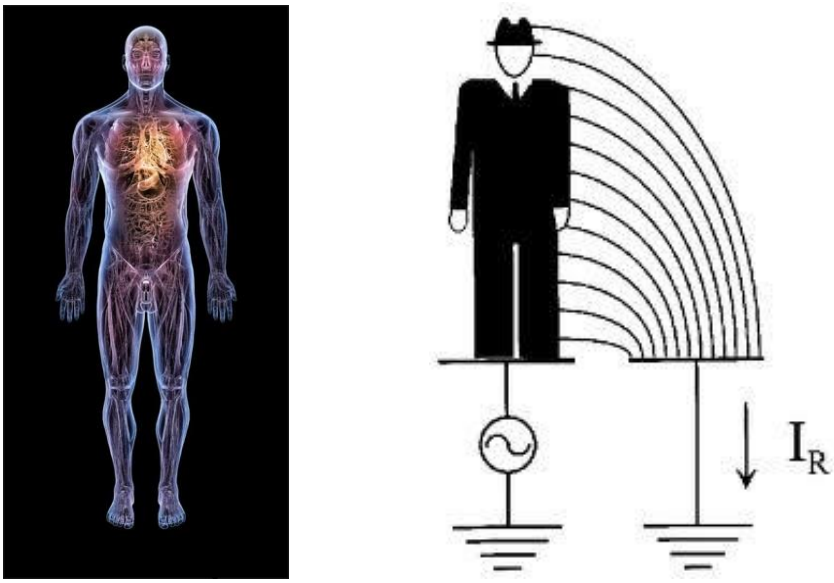

Fig. 2. Variation of Human Electric Potential over the body

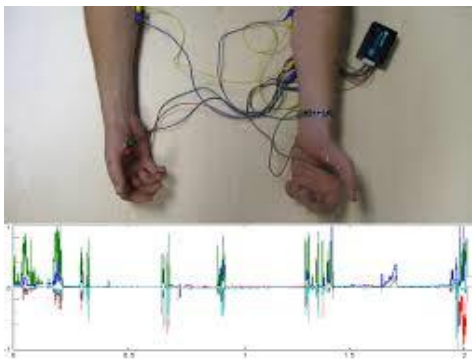

Fig. 3. Electric potential measurement at wrist

Normally the Electric Potential available at the wrist is in irregular manner. The amplitude of the signal available is 0.1micro volt to 5micro volt with frequency range of 0.05 to 120Hz. But the minimum amplitude of the signal is approximately **0.1micro volt .**

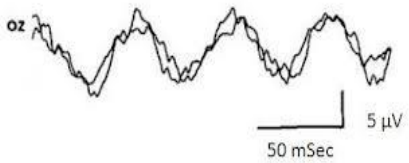

Fig. 4. Electric Potential in Wrist

Thus, here we consider the minimum amplitude of the signal (i.e.) 0.1micro volt. Hence, we supply this 0.1 micro volt to the input of the amplifier and then amplify these signals to higher range. Then it is again fed to voltage regulator and then to rectifier circuit so as to provide the desirable output. Here we use the Linear IC 741 which is also called as Operational Amplifier (Op-Amp). This amplification process, amplifying the input signals from 0.1micro volt to higher volts of approx. 5V is based on the fact that, *"The open loop gain of an Op-Amp is infinite."*

Thus in this model, the 0.1micro volt is fed to the Non-Inverting input terminal of an Op-Amp. In order to provide very high amplification two Op-Amps are cascaded, i.e. the output of the first Op-Amp is fed to the Non-Inverting input terminal of the second Op-Amp, so as it could provide a large gain. As the mobile phones require a 5V DC output, the output of 2nd Op-Amp is fed to the IC7805, a 5V regulating IC. This 5V regulated output is again fed to the Diode so as to produce regulated DC output. In order to provide an absolute DC wave, filters are to be provided. Hence a capacitor is produced in parallel to the diode, so as to provide an absolute DC output. This output can again be fed to the mobile phone, which can be used to recharge the lithium battery of mobile phone.

Though this method is efficient one, it requires DC power supply for IC 741 to operate. It needs 15V DC supply. In order to provide this, a 15 volt battery is provided to this device with a key, so as to include and remove battery from the circuit whenever necessary. The output of second Op-Amp is taken in parallel connection and fed to Rectifier circuit with 15V Regulator and then it is fed to the Power supply PINs 7 and 4 of IC741. Thus at first cycle of circuit, the key is switched ON and it is kept in ON condition until the required power develops on output. When the desirable condition has reached, i.e after the completion of first cycle or when the output is produced, the switch is left OPEN, but still the 5V DC output will be produced.

4. **Experimental Results.** In order to execute the above flow chart, the circuit is designed in the Simulation Software, Multisim. As said above, here the minimum amplitude of the electric potential of the human body is selected; it is of 0.1 micro volts. For easier design, here instead of irregular waveform, an AC signal of 0.1micro volt is considered as the input to the device.

In Fig. 5, the probes namely Probe 1, Probe 2, Probe 3 and Probe 4 placed at various places shows the various parameters like,

- Voltage
- Current
- Frequency

Etc at the various places of the circuits.

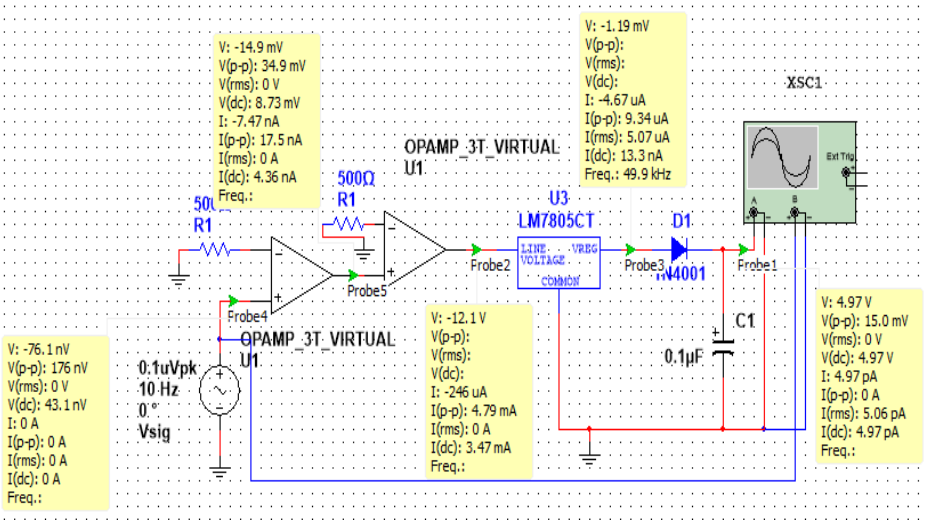

Fig. 5. Captured from NI MULTISIM

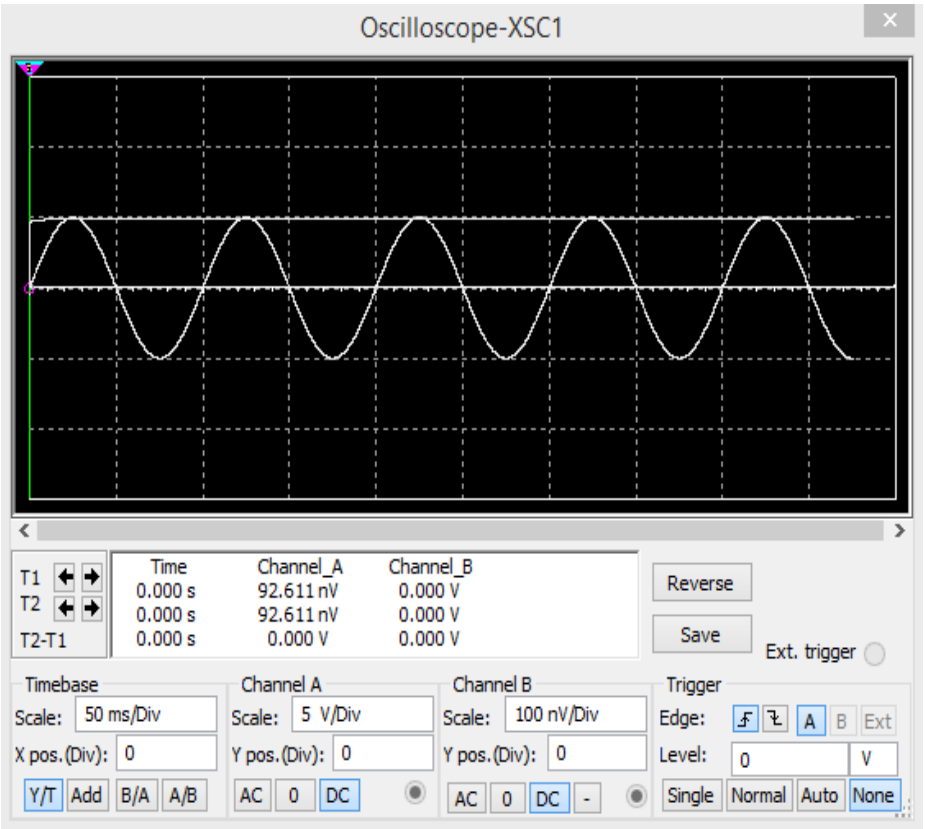

Fig. 6. Oscilloscope reading captured on NI MULTISIM

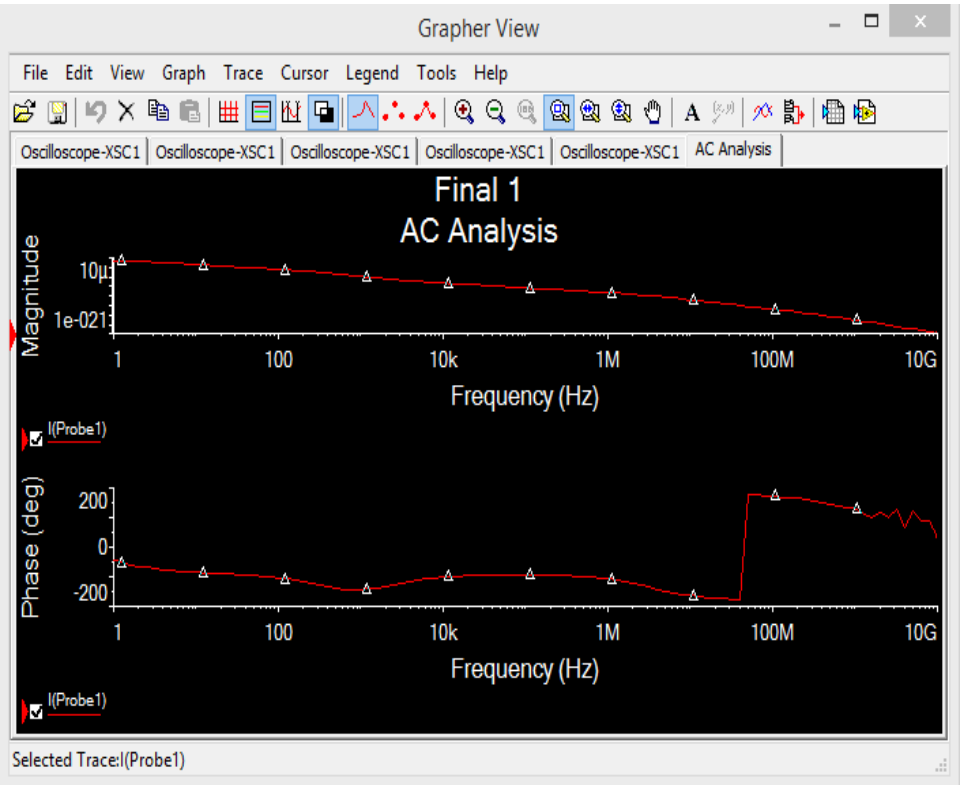

Fig. 7. AC Analysis

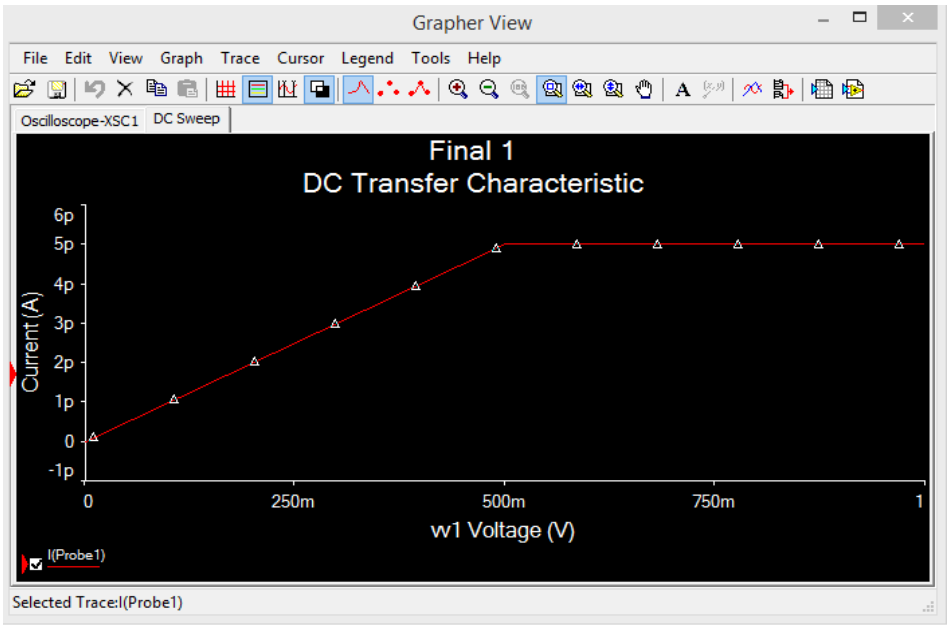

Fig. 8. DC Transfer Characteristics

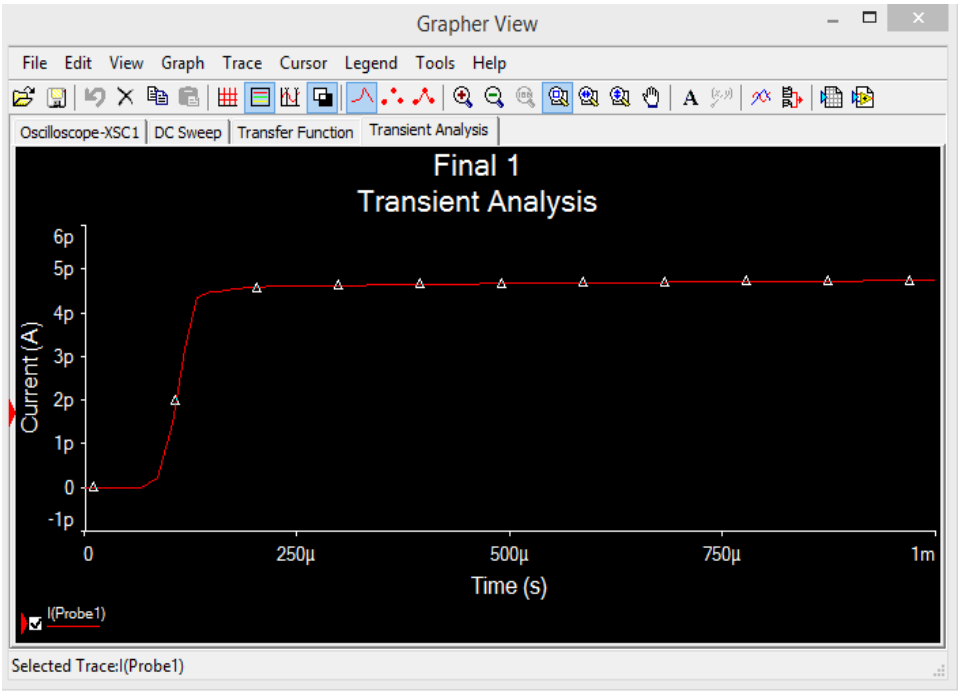

Fig. 8. Transient Analysis

7. **Conclusion.** This device uses the Biometric signals. As this is one of the most commonly available electric potential sources in every human body, it is one of the most effective device. If this device is implemented, it would be the most successful achievements in the field of Medical Electronics.

REFERENCES

[1] A Handbook of Biomedical Instrumentation by Khandpur.

[2] Signal Processing for Biometric Systems by Anil K. Jain, Rama Chellappa,,Stark C. Draper, Nasir Memon,, P. Jonathon Phillips, and Anthony Vetro.

[3] Recent Advances in Viometric Signals Natalia A Schmid**,** Stephanie Schuckers**,** Jonathon Phillips **and** Kevin Bowyer.