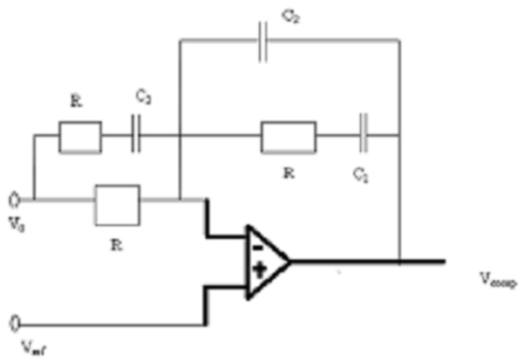

Figure 15 Compensator.

Table 4. Compensator Transfer Function of six geometries

STRUCTURE	COMPENSATOR TRANSFER FUNCTION
RCRC	$\frac{26e3s^2+189e6s+3e11}{s^3+29e3s^2+34e6s}$
RCTAC	$\frac{250e3s^2+1.24e9s+1.5e12}{s^3+5e3s^2+625e6s}$
TACRC	$\frac{250e3s^2+1.24e9s+1.5e12}{s^3+250.6e3s^2+250e6s}$
TACTAC	$\frac{254e3s^2+1.05e9s+1e12}{s^3+250e3s^2+834e6s}$
TRCRC	$\frac{495e3s^2+1.9e9s+1.5e12}{s^3+250.6e3s^2+625e6s}$
TRCTAC	$\frac{2.7e6s^2+7.4e9s+1.5e12}{s^3+250.6e3s^2+625e6}$

3. Results and Discussions

By using the buck converter compensation technique, t voltage produced by the energy harvester is regulated to g constant output voltage which is directly used by the electron devices. This is shown in figures from 16 to 21.

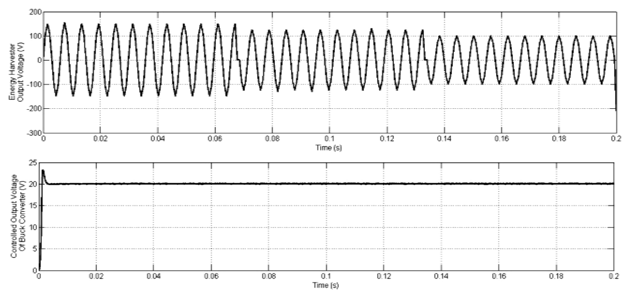

Figure 16 Buck Converter Output Voltage for Various Voltage Produced by the geometry RCRC

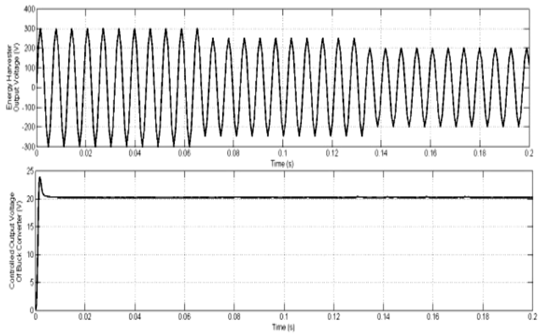

Figure 17 Buck Converter Output Voltage for Various Voltage Produced by the geometry RCTAC

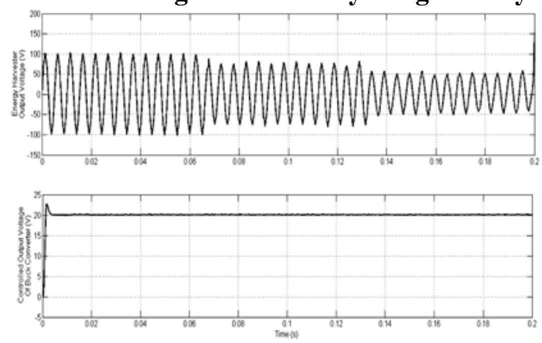

Figure 18 Buck Converter Output Voltage for Various Voltage Produced by the geometry TACRC

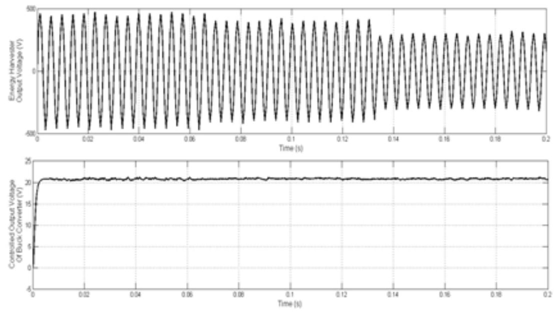

Figure 19 Buck Converter Output Voltage for Various Voltage Produced by the geometry TACTAC

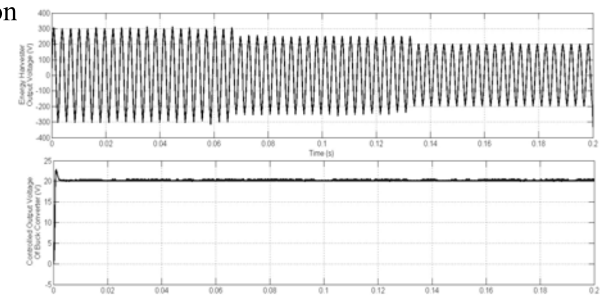

Figure 20 Buck Converter Output Voltage for Various Voltage Produced by the geometry TRCRC

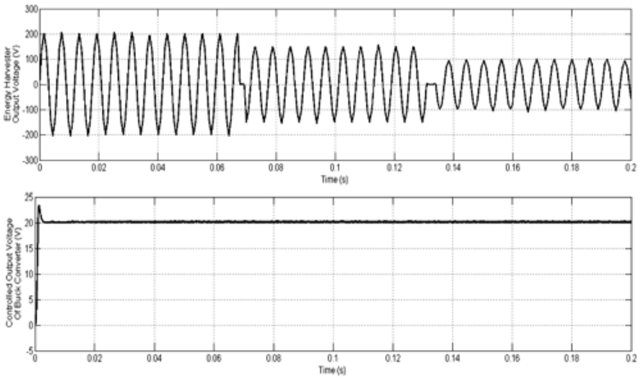

Figure 21 Buck Converter Output Voltage for Various Voltage Produced by the geometry TRCTAC

From the above figures it is seen that the energy harvester output voltage is varied from first resonance voltage to second ,third resonance voltage value and so on.First resonance voltage is the highest voltage produced by energy harvester. In spite of these changes the output of the buck converter remains constant.

4. Conclusion

Six geometries RCRC, RCTAC, TACRC, TACTAC, TRCRC and TRCTAC are simulated. Frequency and finite element analysis are carried out to find the best geometry which can produce maximum voltage. Under the analysis it is concluded that the TACTAC produce more voltage compared to other geometries. The proposed circuit is useful for efficient energy conversion of vibrating piezoelectric generators with application to low power portable devices. An efficient piezoelectric energy harvester either increases the lifetime of the battery of a device or alternatively can be used as a long-life power supply for self-powered remote sensor nodes. With the help of compensator it is able to attend a constant regulated voltage in spite changes in voltage produced by the energy harvester. The proposed energy harvester with buck converter and compensator are used to power electronic devices like laptops, which use 20V voltage.

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