Maestría en Ingeniería en Automatización de Procesos Industriales

Speed control of brushless motors using virtual instrumentation

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Master in Automation of Industrial Processes

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1. Introduction

The development of the electric vehicle has increased because it is an alternative to the use of internal combustion engine vehicles, as well as the development of electric motors capable of satisfying the traction requirements [1, 2].

The brushless motor stands out for being the most used to provide traction to an electric vehicle for its advantages of high efficiency, high operating life, silent operation, less maintenance and its torsion/speed characteristics [3].

2. Objectives

2.1. General objective

Control the angular speed of two brushless motors type SG / F10.

2.2. Specific objectives

- To characterize the speed of brushless motors as a function of voltage.
- To design a speed control program using LabVIEW software.
- To implement the speed control program in the NI myRIO 1900 embedded device.

3. Methodology

Figure 1. Methodology used in this research.

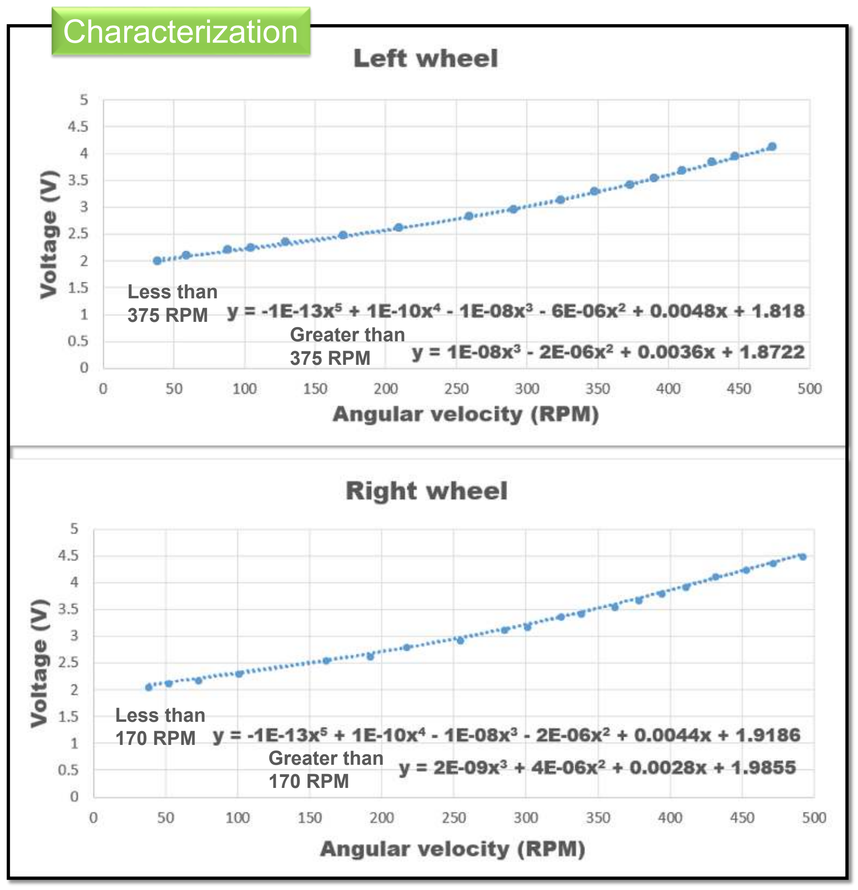

Figure 2. Functions of the speed behavior of the wheels vs voltage.

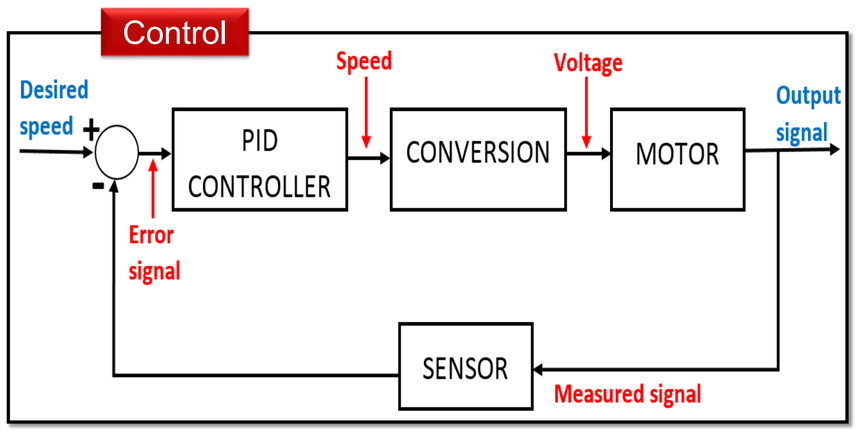

Figure 3. Control diagram.

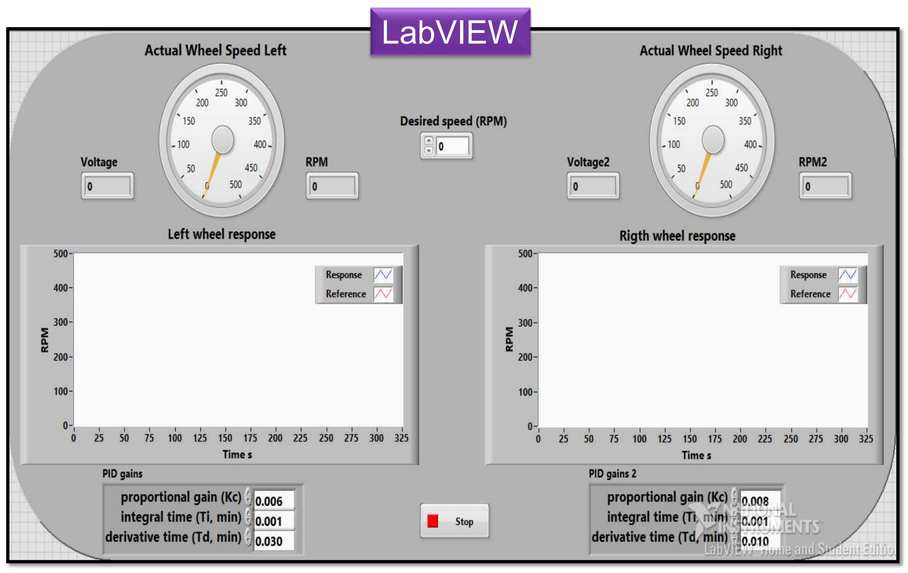

Figure 4. Front panel.

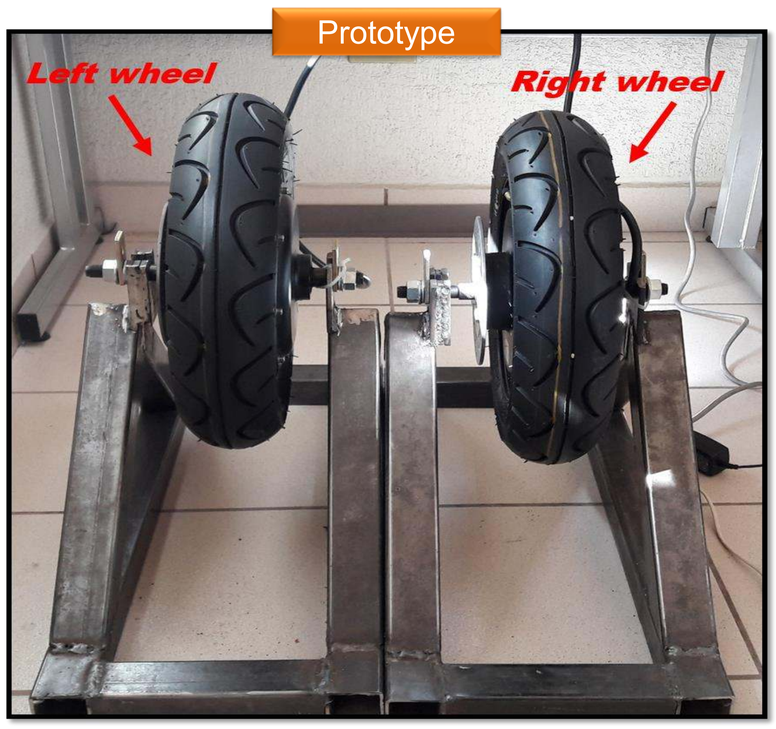

Figure 5. Brushless motors mounted on fixed support.

4. Results

Experimental results with the objective of validating the performance of the virtual instrumentation and the PID controller.

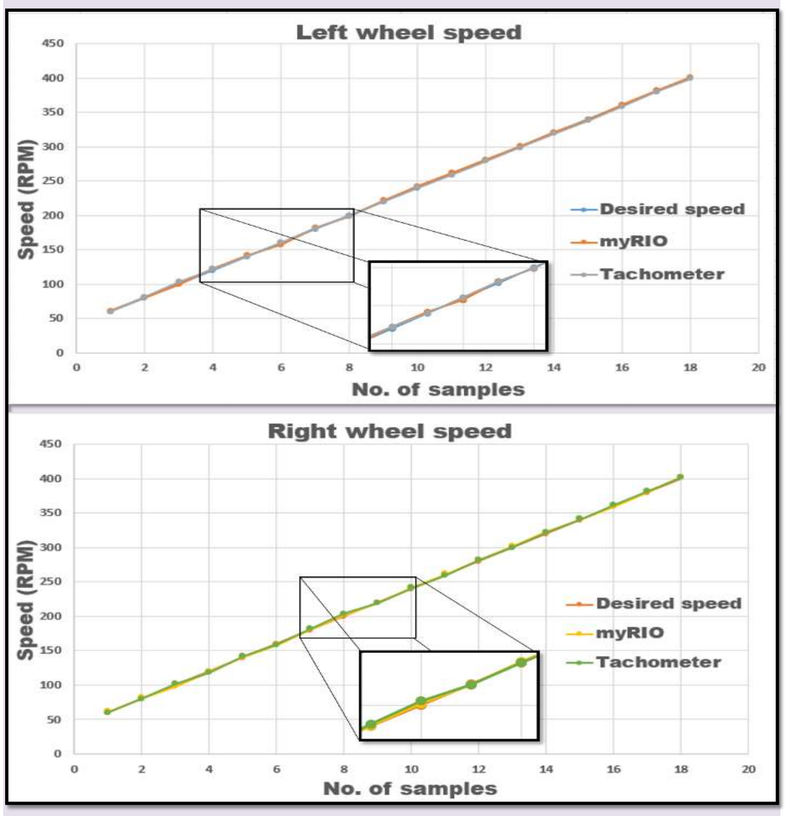

Figure 6. Comparison of speeds of both wheels.

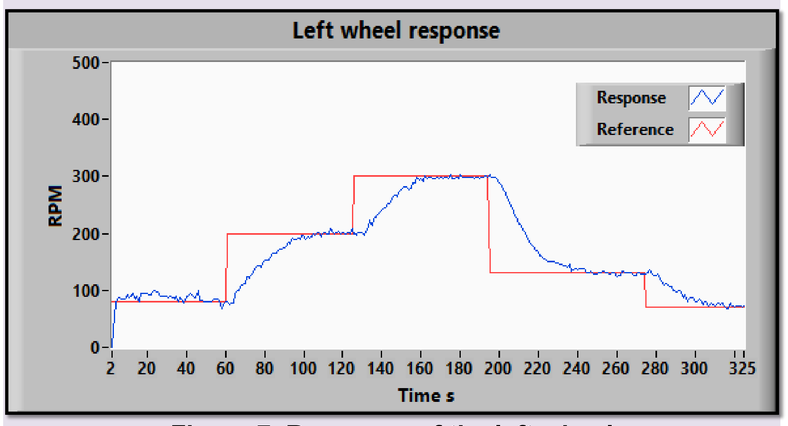

Figure 7. Response of the left wheel.

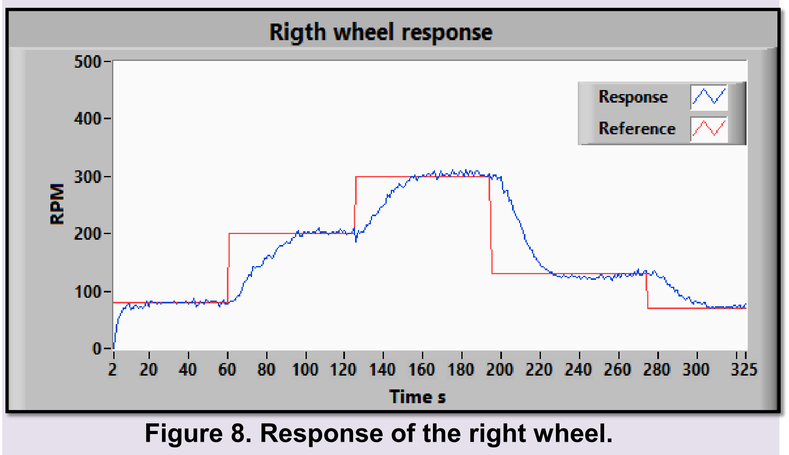

Figure 8. Response of the right wheel.

5. Conclusion

According to the experimental results, we can conclude that the PID controller proposed by virtual instrumentation in LabVIEW allows to modify the desired speed of the wheels in a range of 40 - 400 RPM.

Acknowledgements

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References

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