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Development of a computational package for the acquisition and processing of signals in test benches.

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Abstract
Rotating machineries have been widely used in the industrial sector and power generation plants. Therefore, it is indispensable to carry out analysis involving the detection of failures in experimental tests, in order to better understand the dynamic behavior of these machines and equipment. Thus, the computational routines must be developed, in order to acquire and process the experimental signals, allowing to identify faults presented in the rotating system.

Key words:
Rotating Machinery, test bench, acquisition and signal processing.

Introduction

As any machine in operation presents elements such as motors, generators, shafts, bearings, couplings and transmissions, among other components, the study of rotating machines is very important for the dynamics and mechanical design area. In order to develop the technologies of the area, it is necessary to realize tests. These are performed through the generation and processing signals in experimental test rig that are integrated into computational packages, whose objectives are to analyze the dynamic behavior and identify faults in the rotating system. With the signals processes, it is possible to transform the data obtained into graphs for comparison with theoretical models of an ideal rotation behavior. Among the failures, it can be mentioned the unbalance and misalignment of the test rig.

Results and Discussion

During the execution of the project, it was possible to develop a computational package (Figure 1) using LabView software, which is system engineering software created specifically for applications involving test, measurement and control, with access to hardware and information obtained from the data.

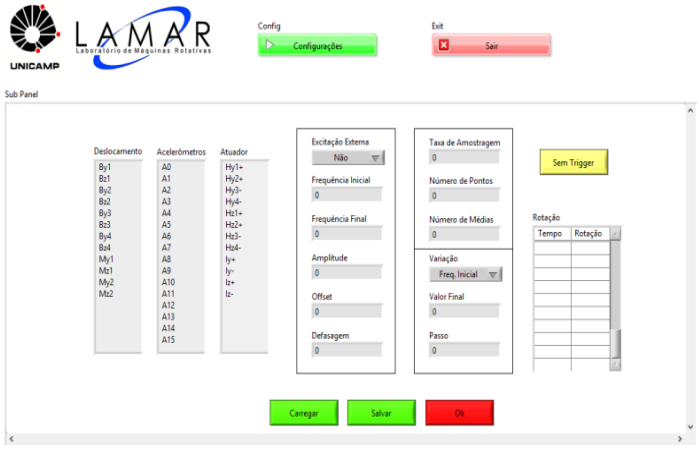

Figure 1. User program interface.

Associated with the signal processing program, the communication between the test rig and the National Instruments NI USB-6363 acquisition board was configured, considering also others laboratory equipment such as an analog filter. To measure the experimental response of the test rig, displacement sensors, accelerometers and load cells can be applied on the bearings location. In that way, the dynamic behavior of the system is monitored. Figure 2 shows signals of displacement obtained in the experimental test rig.

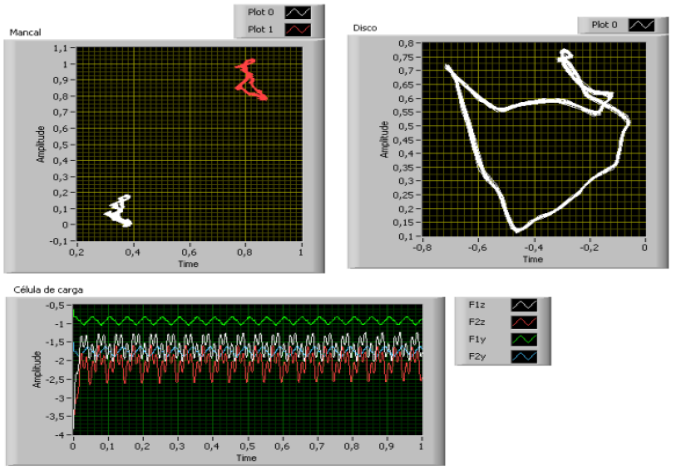

Figure 2. Results of displacement signals.

Conclusions

With the implementation of the computational package, it was possible to perform tests, in order to analyze the behavior of the test rig and the sensors that are present in it. Thus, it can be seen that the experimental set up, as well as, its components are able to perform measurements and, consequently, progress with different researches.

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