Figure 4. Sensibility of a Y axis when the vibration is in X axis.

DYNAMIC PACKAGING CHARACTERIZATION AUTOMATIC TEST SYSTEM

Joaquín del Río[1], Manuel García-Romeu[2], Enrique de la Cruz[2]
1-SARTI Research Group. Universitat Politècnica de Catalunya (UPC). www.cdsarti.org
2-ITENE Instituto tecnológico del embalaje, transporte y logística. www.itene.com

Abstract- The optimization phase in the packet design process is important to ensure the integrity of the element to transport. For this reason, to know the frequency response of the packet in function of vibrations and other parameters an automatic test system has been design. In this article is shown test system and mainly the data acquisition system in order to acquire long temporal series of the vibration signals. The system is composed by a SCXI rack to provide accelerometer signal conditioning, USB data acquisition system and the real-time data processing is carried out by a personal computer and a LabVIEW application.

Introduction:
To ensure the packaging function in front of vibrations or shocks in freight transport is necessary to characterize the response of the packaging. It is considered the packagint as an element mechanically deformable and if we put a mass on top it can be modelled as a spring with a elastic constant Ks, and absorption coefficient , and theses parameters are being affected over the time.
In order to study the frequency response variation over time of the packaging and to know the evolution of its parameters Dr M. Garcia Romeu has designed a method in his PhD thesis for simulation of the real conditions that affect the packaging and be able to predict its behavior.
To know the temporal evolution of mechanical resistance of the packaging in front of the mechanical stress produced during transportation is the main objective of the design presented in this article.

System Description:
The design consist of a fatigue structure shown in figure 1, that provide to the device under test (packaging DUT) a gravitational

FIGURE 1. Fatigue Structure

load and a controlled vibration that is the mechanical stimulus. The frequency response to the stimulus (vibrations) are function of the dynamic parameters of the packaging Ks and . The signal processing of the stimulus and the packaging response, and the data acquisition of these two acceleration sensors has been carried out by a USB data acquisition system, a SCXI signal conditioning and a LabVIEW application, shown in figure 2.
The application developed provide configuration of the data acquisition and conditioning parameters, data archiving in files and data processing in order to visualize the frequency response of the packaging using the FRF (frequency respond function), extracting the characteristics parameters and his evolution over the time in a long duration test. This evolution defines if the