# **Bench introduction: Intelligent maintenance system (IMS) bearing dataset**

## **Dataset overview**

The IMS bearing dataset is from the Center for IMS in the University of Cincinnati and consists of three run-to-failure experiments on a loaded shaft [1]. The data are obtained by conducting endurance tests of natural degradation [2].

## **Bench information**

Figure 1 shows the bearing test bench of IMS, which mainly consists of an AC motor, a loaded shaft, four roller bearings, a thermocouple, and accelerometers. In the first experiment, there are vertical and horizontal accelerometers in the housing of each bearing, which means that the vertical and horizontal acceleration signals of each bearing were recorded. And in the other two experiments, there is only one accelerometer in the housing of each bearing.

图示

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Figure 1: Overview of IMS [3]

## **Characteristics of tested bearings**

The parameters of the four bearings (Rexnord ZA-2115) are given in Table 1.

Table 1: Detailed parameters of the bearing [2]

表格

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## **Vibration signals**

The sampling frequency is 20 kHz, and 1 second is acquired every 10 minutes, recording 20480 samples per second.

手机屏幕的截图

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Figure 2: Illustration of acquisition parameters for vibration signals

## **Operating conditions**

Table 2 lists detailed information on the IMS datasets. Datasets 1, 2, and 3 represent three experiments, respectively. The first dataset includes the acceleration signals of the bearings in the vertical and horizontal directions. The second and third datasets only collected acceleration signals in the horizontal direction.

Table 2: Datasets of IMS [2]

表格

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# **Reference**

[1] J Lee, H Qiu, G Yu, Ja Lin, et al. Bearing data set. IMS, University of Cincinnati, NASA Ames Prognostics Data Repository, Rexnord Technical Services, 2007.

[2] William Gousseau et al. ‘Analysis of the Rolling Element Bearing data set of the Center for Intelligent Maintenance Systems of the University of Cincinnati’. In: *CM2016*. 2016.

[3] Hai Qiu, Jay Lee, Jing Lin. “Wavelet Filter-based Weak Signature Detection Method and its Application on Roller Bearing Prognostics.” Journal of Sound and Vibration 289 (2006) 1066-1090.