**2021-01-15**

The data are obtained based on the following scenario:

* A three-phase orange electric drive connected in delta configuration is the tested motor further named as ***Orange***
* A black electric drive simulates the ***load*** (here constant load)

*Orange* is fed by a frequency converter (power converter) that is controlled by a microcontroller that establishes a preprogrammed functioning scenario (in this case a repeating cycle: constant speed [75% from max. val.] - ramp rising - constant [85% from max. val.] - ramp rising - constant [100%] - slope speed decreasing until the initial speed [75%]).

Randomly a supplemental resistor is inserted on one phase (after the power converter to simulate motor parameter changes/fault).

The video record is interesting for understanding the goal of the experiment - around min. 5:50 artificial fault can be noticed as special vibration is induced (with a good sound quality system can be noticed the difference between smooth functioning and then abnormal vibrations).

Obtained data are in the csv file. The separator is ",".

The recorded data are digital data sampled with 10 bits analog-digital converter. If needed they can be converted to get the physical meaning (e.g., for electric currents 1023 is for +10 Amps, 0 is for -10 Amps).

The columns have the following meanings:

**1st col.**: Timestamp (microcontroller ticks)

**2nd to 4th col**.: electric currents from the three phases

**5th col.**: the amplitude signal obtained from a capacitive microphone placed very close to the Orange.

In the mentioned folder it can be found plots of extracted data for a small window time. It seems that obtained data are reasonable.

**2021-01-21**

The currents sensors are placed in the proper position of the testbed (power network –> sensors –> power converter –> ***Orange*** => ***load***) (-> electrical connection, => mechanical connection)

New experiments uploaded:

* Data from the testbed without fault (file ***currents\_sound\_no fault.csv***)
* Data from the testbed with fault introduced (file ***currents\_sound\_with fault.csv***)
* Data from the testbed without Orange powered up (only sound – Ambiental, voices) - to evaluate if the capacitive sound sensor is adequate (file ***no\_currents\_only sound [ambiental + voices].csv***)

Draft reconstruction (for demonstration purposes only) in Matlab of the recorded sounds were uploaded (please note that no exact sampling period was imposed and acquired data were raw scaled to be usable with Matlab functions).

**2021-02-11**

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**2021-02-15 – SOUND ONLY**

Data acquisition related to sound sensor added. For better speed acquisition time stamp and any other irrelevant data were dropped. Sampling frequency is around 3.5 - 3.7 kHz (what was obtained from an Arduino Mega board).

* csv files contain sound amplitude
* wav files contain sound reconstructed (in Matlab base on acquired data)

**2021-03-26 – ACCEL ONLY**

Data acquisition related only to **vibrations**.

Note1: Due to more complex task than before in this experiments set is missed the timestamp, however the sampling frequency is comparable with that from the previous experiments with vibrations.

Note2: Data available are the *accelerations* on the *three axes*.

**Experiment setup:** there were used ***two*** configurations

1) a new (in fact is a very old as age, at least 30 – 40 y.o.) 1.5 kW electric motor was introduced. It was named the “***gray****"* (see picture below – here it is seen when is not tested)*.* It cannot be introduced in a setup like the *orange*, but at its shaft was adapted on a disk a small plus material such that to have something that mimics the principle of balancing lead weights on the car wheels. So, there were recorded vibrations with and without unbalancing weight. This weight was a small one, a piece the size of a washer (a small approx. 1 cm diameter flat ring made of metal, that we usually use under a nut or the head of a bolt) that was introduced in one of the holes (see photos below). With a higher mass the vibrations were too strong for the safety of the experiment. The presence of the weight was named ***unbalanced*** and ***balanced*** otherwise. In case of electrical fault, the scenario was the same as already performed with ***orange*** and named ***electric fault***.

2) the setup with the ***orange*** were as the already known where an additional electric machine was uses to simulate the load aligned considered ***balanced*** and unaligned as ***unbalanced***.



Fig. The new motor introduced (the *gray*)

The two different scenarios share in common only the electric fault. From mechanical point of view, they are different.

The *filename* codes the scenarios tested:

***gray\_75\_balanced.csv***

(1) \_ (2)\_ (3) .csv

(1) the type of motor used in the experiment

(2) the percentage of the maximum speed provided by the frequency converter (let say the rpm in %)

(3) the condition (without or with fault: mechanical unbalance, electric fault – power supply contact problem);