Bininstrumentation Assignment 1 Answer Version 3

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**Problem 1**

**Definitions of below items:**

**Measurand:**  
While measuring the quantity of an object, the quantity is used to symbolize the value. The object is referred to measurand. A particular object ,it’s physically value is being measured by transducer and be quantified. This process is called measurant. It includes desired input and object of measurement.

**Direct operational mode:**  
It can directly communicate through terminal.

**Invasive and non-invasive:**  
Non-Invasive sensors is device that do not require biofluids by take samples from human body. Optical transducer is one of them. In opposite, invasive sensor require input of sample. Non-invasive is getting popular in detecting of blood sugar since it does not require blood sample.

**Generating mode:**  
In this mode, induction motor runs faster than synchronous speed of the motor. It occurs when the rotor is connected to a primer mover. The motor works as an induction generator.

Breaking mode refers to actual speed of motor is more than synchronous speed of the motor

**Real-time measurements:**  
It’s the value of intentianlly measured object at time of measurement.

**Interfering input:**  
It’s a built-in unsensitive parameter that is unintentionally as instrument needs.

**Correlation coefficient:**  
It’s a value that represents how two variables are related to each other. For instance, one variable(x1) has value of a set of value ( 1, 2 ,3 4) and the other variable has value of (2,4,6,8). It can be concluded that these two variables are highly correlated as variable 2 just muliplication of variable 2.

**Zero drift:**  
microvolt offset and nanovolt offset of instrument which will increase accuracy. It refers to small change of measurand.

**problem 2:**  
refer to attached A1\_answer.m

**problem 3:**  
I have shown my calucation and simulation below. The plot does not look like band pass filter response and I don’t know here I did wrong.

source\_voltage = 2  
  
f\_L = 100  
  
f\_H = 600  
  
R\_1 = 1000  
  
R\_2 = 1000  
  
gain\_ratio\_dB = 10  
  
C\_1 = (1/(f\_H \* 2 \* 3.14 \*R\_1))\*1000000  
   
C\_2 = (1/(f\_L \* 2 \* 3.14 \*R\_2))\*1000000  
  
gain\_ratio\_normal = 10^(gain\_ratio\_dB/20)  
  
sprintf("First capacitance is %.2fuF",C\_1)

## [1] "First capacitance is 0.27uF"

sprintf("Second capacitance is %.2fuF",C\_2)

## [1] "Second capacitance is 1.59uF"

sprintf("output voltage divided by input voltage is %.3f",gain\_ratio\_normal)

## [1] "output voltage divided by input voltage is 3.162"

“Question 3 configuration using EAGLE”

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