Hello students.

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Goa. Today we'll be covering Unit 3 signal conditioning and

the module name is instrumentation amplifier using

Transducer bridge, an chopped and modulated DC amplifier.

The model number is 20.

The outline of this module is instrumentation amplifier using

transducer bridge. And chopped modulated DC amplifier.

Through this model, the student will be able to

explain the working principle of

instrumentation amplifier using a transducer bridge

and explain the working principle of a chopped and

modulated DC amplifier.

Let us begin with the module.

So in the previous lecture we learned about instrumentation

amplifier. Now over here.

The instrumentation amplifier is connected to a transducer

bridge. The resistive transducer is connected to one arm of the

bridge, so you can use a resistance thermometer. You can

use a strain gauge or any other

resistive transducer. RT is the resistance of the

transducer, and Delta R is the change in resistance of

the resistive transducer.

The values of our RA RB and RC are chosen in such a way

that it is almost equal to the values of RT.

The total resistance of the transducer is given

as RT plus Delta R.

The condition for the bridge to be balances VB has to be equal

to VA or.

RB divided by total resistance that is RB plus RC into E

should be equal to RA divided by total resistance. That is RT

plus RA into E, so we're using over here. A simple method called

as voltage divider method.

In simple words, the ratio of RB upon RC has to be equal to RA

upon RT, so this is a very important thing required in

order to balance the.

Bridge.

Now the bridge will be balanced for the desired reference

conditions, so depending on what temperature you want the bridge

to be balanced, you can balance the bridge. So as the physical

quantity changes, the resistance of the transistor also changes,

causing the bridge to be unbalanced and the output

voltage what is produced at the.

3rd Opamp is the function of the change and resistance of

the transducer.

Let us go into detail.

The potential at VB will always be constant, but potential at VA

will always be varying depending on the change in resistance. So

the value of VB is given as RB divided by total resistance.

That is RB plus RC into E is your voltage required for

exciting the Wheatstone bridge.

VA is given by RA divided by total resistance that is RA plus

RT plus Delta into E. So when the bridge is balanced the

potential of VA & VB will be the same. But if there's any change

in physical quantity, the potential of VA will vary. So

keep this in mind. The potential of VA is applied to the 1st.

Input of the opamp that is A1 and potential VB is applied to

the input of the second of opamp.

Both opamps A1 and A2 act as a unity buffer amplifier.

Normally a buffer is used to provide you high input impedance

and low output impedance.

And the third. Amplifier is used as a differential amplifier, so

if the values of all these four are the same, this particular

becomes a subtractor.

So the gain of this particular amplifier is 1, but in this

particular example we have made the values of R1 and R2 the same

and the values of R3 and RF the same. This VAB will be amplified

with the gain of RF upon R1.

So this is how you can construct a instrumentation

amplifier to measure.

Temperature to measure intensity of light or to measure any other

physical condition which refers to resistive transducer.

So the applications of instrumentation amplifier is.

You can make the entire.

Circuit as a temperature indicator using thermistor

you can make a light intensity meter or you can

also use as a analog weight scale.

Now coming to the next topic will be doing chopped and modulated

DC amplifier.

A chopper amplifier is an amplifier where the DC input

voltage is literally chopped to produce an AC signal.

This signal is amplified by a standard AC amplifier and

finally it is converted back to a DC signal.

The chopping action can be in two ways, electronical or

mechanical, so this is just clear glimpse of how does a

chopper modulated DC amplifier looks. Initially we have a DC

input, the DC input is going to be converted into an AC input.

These AC input will be amplified by an AC amplifier, called as AC

output, and finally it will be converted back to your DC

output. So if you have notice,the level of your DC input has

been. Increased

now coming to the explanation of a chopped Modulated DC amplifier.

It consists of two Transformers.

Input Transformer and output transformer. VI is the input DC

voltage. So this switches alternately connects between

A & B. Keep this in mind. Also there's another switch which is

connected at the output. Both the switches are gang tuned,

meaning that connected together.So when this is connected on the

top point it is a. This also is

connected on Top point, when the switch is coming down to

B this also switches connected towards the bottom

point so when switches at position A the current flows in

One Direction. But when the switch is connected to position

B, the current flows in the

opposite direction. Therefore,a AC voltage will be induced

in the secondary winding.

The peak value of the induced voltage is proportional to the

value of your DC input. So Suppose the input voltage 10

millivolts. The peak voltage also will be 10 millivolts,

and the negative peak also will be 10 millivolts.

Now this induced voltage what is produce will be amplified by a

simplifier. An amplified square wave appears at the

primary winding at the output of the transformer. Now this

AC signal will be converted back to the DC signal.

The secondary winding of the output transformer is centrally

taped with an output switch which is mechanically coupled to

the input switch.

This is the waveforms of.

A chopped and more later DCamplifier. This is the input

voltage across the primary winding of the output

transformer and this is the output voltage of the secondary

winding of the output transformer. With this we have

completed our module in chopped and modulated DC amplifier.

These are my references.

Thank you.