Unit-III PERFORMANCE OF TRANSMISSION LINES

Session 1- Transmission line performance

Quiz

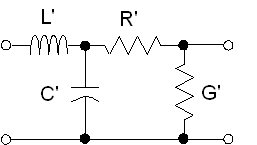
1. What are the types of transmission lines?
2. What are the performance parameters of a line?
3. What is voltage regulation?
4. Define transmission efficiency

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

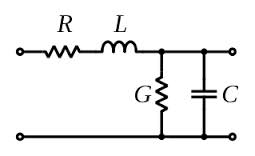
Presentation

Giving detailed explanation on performance of a line

**П-model**



**T-model**



Board activity

Drawing the different conductor configuration for performance analysis

Ref; <http://www.cvel.clemson.edu/Emc/calculators/TL_Calculator/index.html>

Session 2- Equivalent circuit

Quiz

1. What is inductance?
2. What are the advantages of three systems?
3. What are the parameters affecting inductance?
4. Classify the transmission line arrangements

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Presentation

Derivation for magnetic flux intensity

External intensity

Internal intensity

Derivation for magnetic flux intensity

External intensity hx =I/

Internal intensity hx=Ix/2

Where

Ix=current enclosed by the path

r = radius of the conductor

Hx= flux density

Board activity

Drawing the different conductor configuration

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Session 3- Regulation and efficiency

Quiz

1. What is regulation?
2. List the components of flux linkages in a conductor

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Presentation

Calculation of efficiency

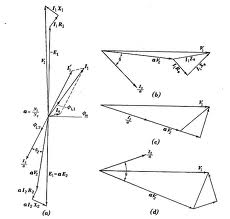
Performance of transmission lines is meant the determination of efficiency and regulation of lines .The efficiency of transmission lines is defined as

[http://2.bp.blogspot.com/_v2T5FtcWTMk/Rujkpq8BC-I/AAAAAAAABLQ/uNYICGUKG9Y/s400/tr+effic.bmp](http://2.bp.blogspot.com/_v2T5FtcWTMk/Rujkpq8BC-I/AAAAAAAABLQ/uNYICGUKG9Y/s1600-h/tr+effic.bmp)

Board activity

Deriving the expression

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>



Session 4- Voltage regulation

Quiz

1. What is voltage regulation?
2. Effects of voltage regulation
3. Ways to reduce voltage drop.

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Presentation

Giving detailed explanation on calculation of voltage regulation

Voltage regulation

**Voltage Regulation**

voltage regulation of a line is defined as the change in voltage at the receiving end when full load at a given power factor is removed, the voltage at the sending end being kept constant. it is expressed as a fraction or a percentage of the receiving end voltage at full load. it can be written as, 

**Per unit regulation** **=** **Vrnl** **- Vrfl** **/ Vrfl**  
**Percent regulation** **=** **(Vrnl** **-** **Vrfl** **/** **Vrfl) \* 100**

Board activity

Solving a problem

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Session 5- Symmetrical and unsymmetrical spacing

Quiz

1. What are GMD and GMR?
2. Factors affecting L
3. Name the materials used for conductors

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

Presentation

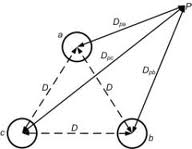
Giving detailed explanation on parameters of line

Inductance

Board activity

Drawing the different conductor configuration

Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>



Session 6- Inductance Difference-Causes

Quiz

1. What causes differences in inductance of three conductors?
2. Symmetrical spacing.
3. Transposition of conductors.

Ref: <http://www.technoend.com/what-is-transposition-of-electrical-transmission-line/>

Presentation

Giving detailed explanation on parameters of line

Inductance

Board activity

Solving a problem on inductance of conductors with unsymmetrical spacing.

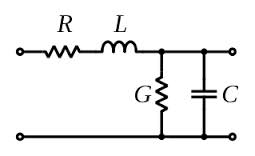
Ref: <http://www.skm-eleksys.com/2011/03/transmission-line-parameters-resistance.html>

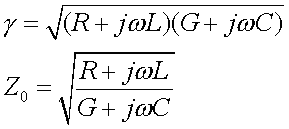
Session 7- T model of a line

Quiz

1. What are the models of of a line?
2. Define regulation
3. Factors affecting regulation

Ref: <http://www.electrical4u.com/abcd-parameters-of-transmission-line/>Presentation

Phasor diagram of T model 



Regulation

Voltage

Board activity

Solving a problem

Ref: <https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&ved=0CDoQFjAD&url=http%3A%2F%2Fwww.ee.lamar.edu%2Fgleb%2Fpower%2FLecture%252009%2520-%2520Transmission%2520lines.ppt&ei=Bu8yUt6tD8SPrgeGyYBA&usg=AFQjCNEio_CEVpfccS3Bd6rFmVfTO94DMQ>

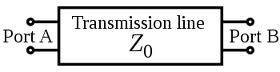
Session 8- calculation of sending end power

Quiz

1. What is Ferranti effect?
2. Factors affecting sending end voltage
3. ABCD constants

Ref: <http://www.researchgate.net/post/What_is_the_real_interpretation_of_ABCD_parameters_for_transmission_line>

Presentation

Giving detailed explanation on ABCD constants 

Board activity

Deriving expression for ABCD constants

Ref: www.egr.unlv.edu/~eebag/TRANSMISSION%20LINES.pdf‎

Session 9- Need for compensation in lines

Quiz

1. What are the components of reactive power?
2. Effects of non optimized reactive power flow
3. Definition for reactive power

Ref: <http://electrical-engineering-portal.com/the-need-for-reactive-power-compensation>

Presentation

Giving detailed explanation on types of compensation

Board activity

Deriving expression for ABCD constants

Ref: <http://www.alstom.com/grid/products-and-services/high-voltage-power-products/power-compensation/>

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Session 10- Rotor angle stability

Quiz

1. What is stability of a power system?
2. Factors affecting stability
3. Rotor angle stability

Ref: <http://electricalquestionsguide.blogspot.in/2011/12/rotor-angle-stability-synchronous.html>

Presentation

Giving detailed explanation on power angle stability

Board activity

Deriving expression for power angle equation

Ref: <http://www.slideshare.net/Shahabkhan/definition-classification-of-power-system-stability>

Session 11- Surge Impedance Loading

Quiz

1. What is surge impedance?
2. Factors affecting amount of loading
3. Significance of SIL

Ref: <http://electricalquestionsguide.blogspot.in/2012/05/surge-impedance-loading-sil.html>

Presentation

Giving detailed explanation on surge impedance loading

Board activity

Deriving expression for surge impedance loading

Ref: <http://www.transtutors.com/homework-help/electrical-engineering/power-system/surge-impedance-loading.aspx>

Session 12- Angle and voltage stability considerations

Quiz

1. What is rotor angle stability?
2. Factors affecting angle stability
3. Importance of rotor angle stability

Ref: <http://electricalquestionsguide.blogspot.in/2012/05/surge-impedance-loading-sil.html>

Presentation

Giving detailed explanation on rotor angle stability

Board activity

Deriving expression for rotor angle stability surge impedance loading

Ref: <http://www.transtutors.com/homework-help/electrical-engineering/power-system/surge-impedance-loading.aspx>