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/$2πx$

 Internal intensity hx=Ix/2$πr^{2}$

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



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>