SNS COLLEGE OF ENGINEERING

(Autonomous)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

19EC502 – TRANSMISSION LINES AND WAVE GUIDES

III YEAR/ V SEMESTER

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UNIT 1 – TRANSMISSION LINE THEORY

TOPIC – THE LINE AT RADIO FREQUENCIES & LINE OF ZERO DISSIPATION

THE LINE AT RADIO FREQUENCIES

The line at frequencies of MHZ and above – Assumptions

1. Very considerable skin effect – Internal inductance is zero
2.ω L > > R, while computing Z
3. G=0

LINE OF ZERO DISSIPATION

- For transmission of energy at high frequencies, where the power efficiency is high, assumption of negligible losses or zero dissipation can be used in the analysis of performance of Transmission Lines for easy analysis

- Also known as perfect lines

- R=0 & G=0

LINE OF ZERO DISSIPATION – LINE PARAMETERS

- $Z = j\omega L$, $Y = j\omega C$
- $Z_0 = \sqrt{Z/Y} = \sqrt{j\omega L / j\omega C} = \sqrt{L/C}$
  $= R_0$

- $\gamma = \sqrt{ZY} = \sqrt{j\omega L \cdot j\omega C} = \sqrt{-\omega^2 LC}$
- $\gamma = \alpha + j\beta = j\omega\sqrt{LC}$
- Therefore $\alpha = 0$ & $\beta = \omega\sqrt{LC}$

- $v = \omega/\beta = \omega/\omega\sqrt{LC} = 1/\sqrt{LC}$

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