JUAS 2012 – RF Exam (solutions)

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1 Transmission lines

1. $C' = 1/(v\,Z)$ $C' = 1/(0.5 \cdot c \cdot 75\ \Omega) =$ **88.9 pF/m**
    $L' = Z/v$ $L' = 75\ \Omega\ /\ (\ 0.5\ c\ ) =$ **500 nH/m**
2. $C' = 100 * \mathrm{sqrt}(\varepsilon_r)\ /\ (3Z)$ → $\varepsilon_r = (\ C' \cdot 3Z\ /\ 100\ )\verb|^|2$ → C' = 0.889 **pF/cm**
    $\varepsilon_r =$ **4.0**
3. $Z = \mathrm{sqrt}(\mu_r/\varepsilon_r) \cdot 60 \cdot \ln(R/r)$ → $R/r = \exp[\ Z/(\mathrm{sqrt}(\mu_r/\varepsilon_r) \cdot 60)\ ]$
                    $r = R\ /\ \exp[\ Z/(\mathrm{sqrt}(\mu_r/\varepsilon_r) \cdot 60)\ ]$
                    r = 0.82 mm
4. Which of these are TEM transmission lines? Mark them:
    ✓ Stripline
    ✓ Coaxial cable
5. Advantages of microstriplines
    ✓ Easier to incorporate lumped components (like transistors, capacitors, inductors, etc.)