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Soru 1

a) $Z_L = 50 - 50j \quad Z_0 = 50\Omega$

$Z_N = \frac{50 - 50j}{50} = 1 - j$

$\lambda = 8cm \rightarrow \frac{\lambda}{2}$ Tam tur

$217 \mid 4$, $20 \mid 54$, 17, 16, 1 → $\frac{\lambda}{8}$

$\frac{\lambda}{8} \rightarrow$ kayrak yönünde → duran dalga dairesi

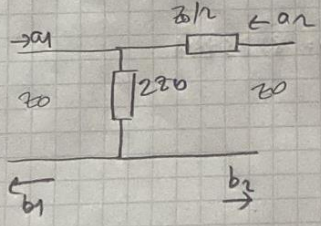
$0,34 + 0,125 = 0,465$

b) $0,5 - 0,34 = 0,16\lambda$

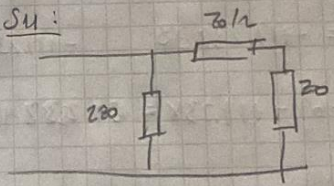
c) $0,16 \times 50 = 20\Omega$

d) $Z_0 = \sqrt{50 \cdot 20} = 10\sqrt{10}\ \Omega$

Soru 2



Su:



$Z_0/2 + Z_0 = 3Z_0/2$

$3Z_0/2 \,//\, 2Z_0 = \frac{3Z_0}{\frac{7Z_0}{2}} = \frac{6Z_0}{7}$

$\frac{\frac{6}{7} - 1}{\frac{6}{7} + 1} = \frac{-\frac{1}{7}}{\frac{13}{7}} = -\frac{1}{13} \simeq -0,077$

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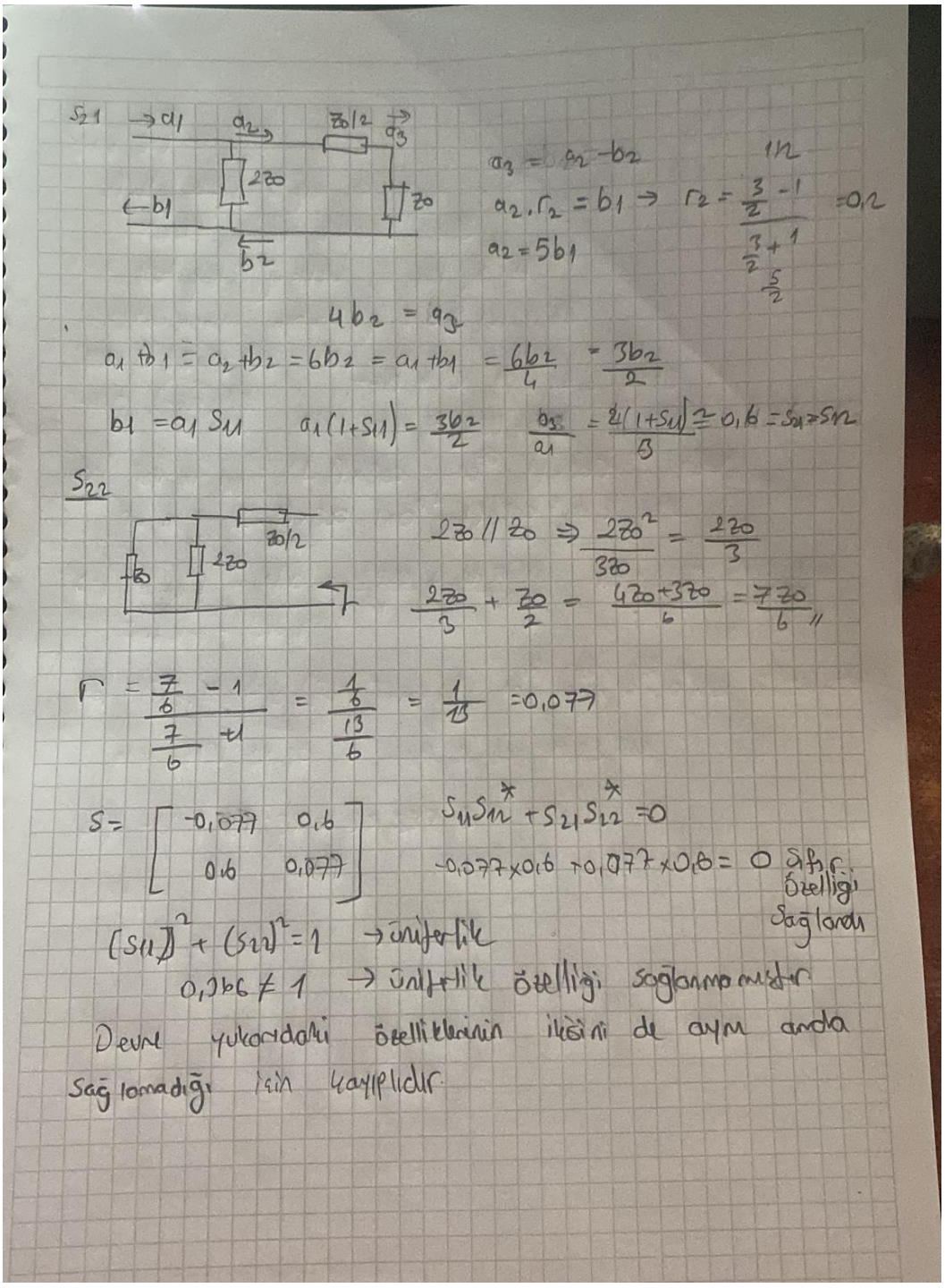


$a_3 = a_2 - b_2$

$a_2 \cdot \Gamma_2 = b_1 \rightarrow \Gamma_2 = \frac{\frac{3}{2} - 1}{\frac{3}{2} + 1} = 0,2$

$a_2 = 5b_1$

$4b_2 = a_3$

$a_1 + b_1 = a_2 + b_2 = 6b_2 = a_1 + b_1 = \frac{6b_2}{4} = \frac{3b_2}{2}$

$b_1 = a_1 S_{11} \quad a_1(1+S_{11}) = \frac{3b_2}{2} \quad \frac{a_3}{a_1} = \frac{2(1+S_{11})}{3} = 0,6 = S_{21} = S_{12}$

S_{22}

$220 // Zo \Rightarrow \frac{220^2}{320} = \frac{220}{3}$

$\frac{220}{3} + \frac{Zo}{2} = \frac{420+320}{6} = \frac{740}{6} //$

$\Gamma = \frac{\frac{7}{6} - 1}{\frac{7}{6} + 1} = \frac{\frac{1}{6}}{\frac{13}{6}} = \frac{1}{13} = 0,077$

$S = \begin{bmatrix} -0,077 & 0,6 \\ 0,6 & 0,077 \end{bmatrix}$

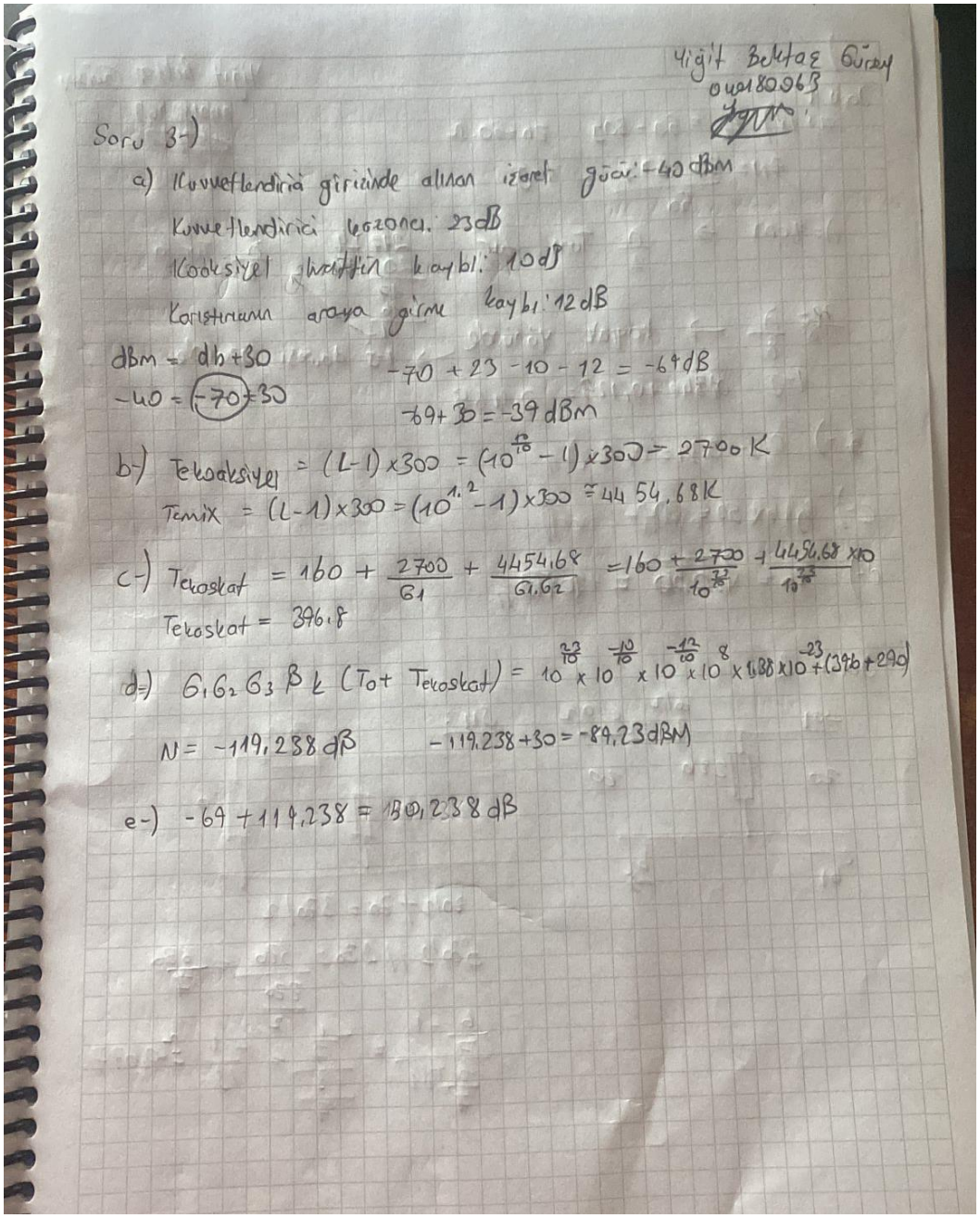
$S_{11}S_{12}^* + S_{21}S_{22}^* = 0$

$-0,077 \times 0,6 + 0,077 \times 0,6 = 0$ Sıfır Özelliği Sağlandı

$(S_{11})^2 + (S_{21})^2 = 1$ → üniterlik

$0,376 \neq 1$ → üniterlik özelliği sağlanmamıştır

Devre yukarıdaki özelliklerinin ikisini de aynı anda sağlamadığı için kayıplıdır.



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Soru 3-)

a) Kuvvetlendirici girişinde alınan işaret gücü: -40 dBm

Kuvvetlendirici kazancı: 23dB

Koaksiyel hattın kaybı: 10dB

Karıştırıcının araya girme kaybı: 12dB

dBm = dB + 30

-40 = (-70) + 30

$-70 + 23 - 10 - 12 = -64\,dB$

$-64 + 30 = -34\,dBm$

b-) Tekoaksiyel $= (L-1)\times 300 = (10^{\frac{1}{10}} - 1)\times 300 = 2700\,K$

Temix $= (L-1)\times 300 = (10^{1.2} - 1)\times 300 \cong 4454,68\,K$

c-) $T_{ekoskat} = 160 + \frac{2700}{61} + \frac{4454,68}{61,62} = 160 + \frac{2700}{10^{\frac{23}{10}}} + \frac{4456,68 \times 10}{10^{\frac{23}{10}}}$

$T_{ekoskat} = 396,8$

d-) $G_1 G_2 G_3 \beta k (T_0 + T_{ekoskat}) = 10^{\frac{23}{10}} \times 10^{\frac{-10}{10}} \times 10^{\frac{-12}{10}} \times 10^{8} \times 1,38 \times 10^{-23} \times (396 + 290)$

$N = -119,238\,dB$ $\quad -119,238 + 30 = -89,23\,dBM$

e-) $-64 + 119,238 = 180,238\,dB$

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