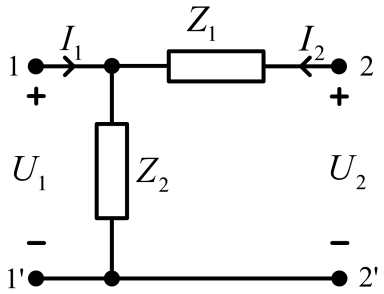
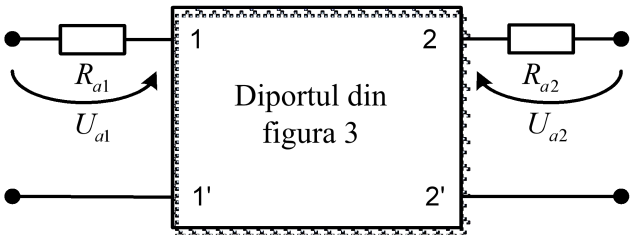
Sample Subjects for SS2 Laboratory Colloquium

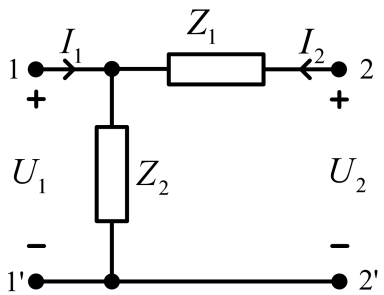
1. Determine the parameters A for the two-port network shown in the figure. For the indirect measurement of the currents at port 1 and port 2, measure the resistance values $Ra1$ at port 1 and $Ra2$ at port 2 using a multimeter set to ohmmeter mode. The measurements are performed with alternating current at a frequency of 10 kHz, and the voltage applied from the generator is 5 Vrms. For the circuit implementation, the following resistances are used: $R_{a1} = 10\Omega$, $R_{a2} = 10\Omega$, $Z_1 = 150\Omega$, $Z_2 = 600\Omega$.

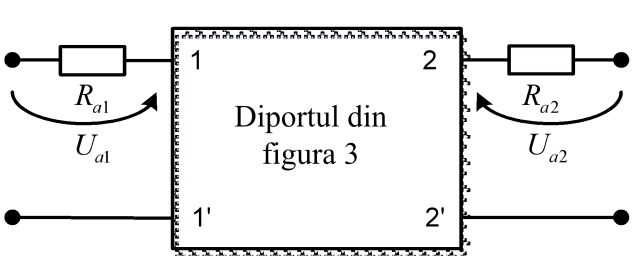




Measured values									Calculated values based on measurements				
The condition $I_2 = 0$				The condition $U_2 = 0$					A_{11}	A_{12}	A_{21}	A_{22}	ΔA
U_1	U_2	U_{a1}	I_1	U_1	U_{a1}	I_1	U_{a2}	I_2					
[V]	[V]	*[V]*	[mA]	[V]	[V]	[mA]	*[V]*	[mA]	-	[kΩ]	[mS]	-	-

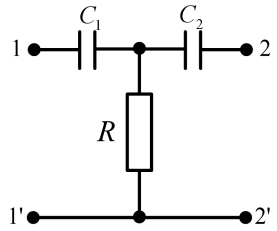
2. Determine the parameters Z for the two-port network shown in the figure. For the indirect measurement of the currents at port 1 and port 2, measure the resistance values $Ra1$ at port 1 and $Ra2$ at port 2 using a multimeter set to ohmmeter mode. The measurements are performed with alternating current at a frequency of 10 kHz, and the voltage applied from the generator is 5 Vrms. For the circuit implementation, the following resistances are used: $R_{a1} = 10\Omega$, $R_{a2} = 10\Omega$, $Z_1 = 150\Omega$, $Z_2 = 600\Omega$.





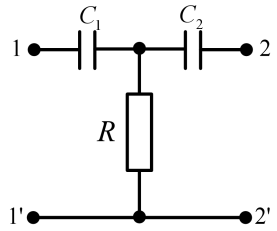
Valori măsurate						Calculated values based on measurements				
The condition $I_2 = 0$			The condition $I_1 = 0$			Z_{11}	Z_{12}	Z_{21}	Z_{22}	$\frac{\lvert Z_{12} - Z_{21} \rvert}{Z_{12}}$
U_1	U_2	I_1	U_1	U_2	I_2					
[V]	[V]	[mA]	[V]	[V]	[mA]	[kΩ]	[kΩ]	[kΩ]	[kΩ]	-

3. Determine the parameters *Y* for the two-port network shown in the figure. Work is done with alternating current at a frequency of 10 kHz, and the voltage applied from the generator is 5 Vrms. The following resistors and capacitors are used for the circuit implementation: $R = 600\Omega$, $C_1 = 100\text{nF}$, $C_2 = 100\text{nF}$.



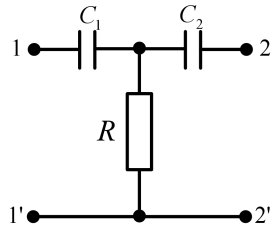
Measured values										Calculated values based on measurements			
The condition $U_2 = 0$					The condition $U_1 = 0$					$\lvert Y_{11} \rvert$	$\lvert Y_{12} \rvert$	$\lvert Y_{21} \rvert$	$\lvert Y_{22} \rvert$
$\lvert U_1 \rvert$	$\lvert U_{C1} \rvert$	$\lvert I_1 \rvert$	$\lvert U_{C2} \rvert$	$\lvert I_2 \rvert$	$\lvert U_2 \rvert$	$\lvert U_{C1} \rvert$	$\lvert I_1 \rvert$	$\lvert U_{C2} \rvert$	$\lvert I_2 \rvert$				
[V]	*[V]*	[mA]	*[V]*	[mA]	[V]	*[V]*	[mA]	*[V]*	[mA]	[mS]	[mS]	[mS]	[mS]

4. Determine the parameter values for the two-port network shown in the figure.Work is done with alternating current at a frequency of 10 kHz, and the voltage applied from the generator is 5 Vrms. The following resistors and capacitors are used for the circuit implementation: $R = 600\Omega$, $C_1 = 100\text{nF}$, $C_2 = 100\text{nF}$.



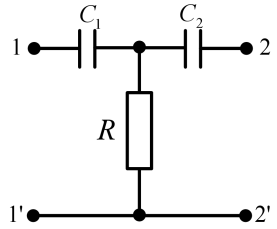
Measured values				Calculated values based on measurements			
The condition $U_2 = 0$		The condition $U_1 = 0$		$arg\{Y_{11}\}$	$arg\{Y_{21}\}$	$arg\{Y_{22}\}$	$arg\{Y_{12}\}$
$\Delta t_{U_{C1}-U_1}$	$\Delta t_{U_{C2}-U_1}$	$\Delta t_{U_{C2}-U_2}$	$\Delta t_{U_{C1}-U_2}$				
[µs]	[µs]	[µs]	[µs]	[°]	[°]	[°]	[°]

5. Determine the magnitude of the voltage transfer factor for the two-port network shown in the figure. Measure the input voltage (U_1) and the output voltage (U_2) for the frequencies in the table. The circuit is powered through port 1, with port 2 being open-circuited. The amplitude set by the generator is 5 Vrms. The following resistors and capacitors are used for the circuit implementation: $R = 600\Omega$, $C_1 = 100nF$, $C_2 = 100nF$.



f [kHz]	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5
$U_1\ [V]$										
$U_2\ [V]$										
$\lvert H_{U21g}\rvert = \frac{U_2}{U_1}$										
$\lvert H_{U21g}\rvert_{teoretic}$										

6. Determine the phase of the voltage transfer factor for the two-port network shown in the figure. The circuit is powered through port 1, with port 2 being open-circuited. The amplitude set by the generator is 5 Vrms. The following resistors and capacitors are used for the circuit implementation: $R = 600\Omega$, $C_1 = 100nF$, $C_2 = 100nF$.



f [kHz]	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5
Δt										
φ [grade]										
$\varphi_{teoretic}$ [grade]										