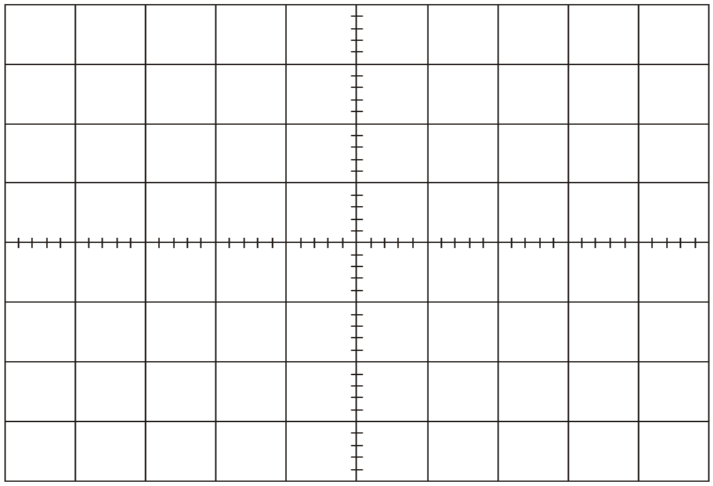
Polish Japanese Academy of Information Technology

Lab. 2	Pasive elements measurement	Date:

name and surname	points	Supervisor

1. Resistor impedance - observation and measurement of time dependence between current and voltage on resistor.

Draw current and voltage on the resistor (measuring module M2, R1R, frequency f = 100kHz, WE-voltage, WY-current).



Caculate:

A. Phase shift (phase ϕ)) between voltage and current :

Period *T*: [number of divisions]	Shift *tp* [Number of divisions]	Phase [$\phi = \frac{tp}{T} 360^o$]

B. Calculate the impedance module |Z|

Upp number of divisions	*Sensitivity*	*Upp*	*Ipp* lnumber of divisions	*Sensitivity*	*UIpp*	$Ipp = \frac{UIpp}{10\,\Omega}$	$\lvert Z\rvert = \frac{Upp}{Ipp}$
[div]	[V/div]	[V]	[div]	[V/div]	[V]	[A]	[Ω]

Ipp - the current is measured by measuring the voltage drop UIpp on the resistor $10\,\Omega$

C. Calculate impedance:

$$Z = |Z|\, e^{j\phi} = ... = R + jX = ... + j\,.....$$

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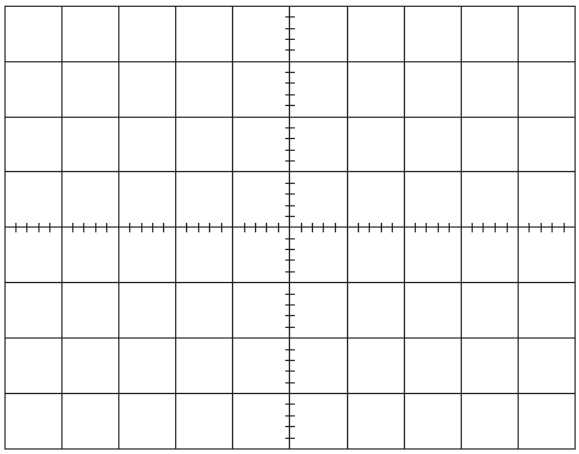
2. Determination of capacitor impedance



Draw the currents and voltages
on the capacitor.

(measurement module M2 CR switch,
frequency f = 100kHz,
WE-voltage, WY-current).

Calculate:
A. Phase shift ϕ between voltage and current

Period *T*: [number of divisions]	Shift *tp* [Number of divisions]	Phase [$\phi = \frac{tp}{T} 360^o$]

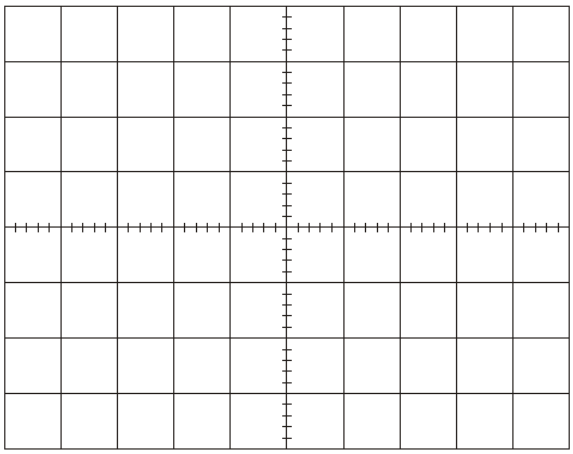
B. Calculate the impedance module |Z|

Upp num. of div.	*Sensitivity*	*Upp*	*Ipp* num. of div.	*Sensitivity*	*UIpp*	$Ipp = \frac{UIpp}{10\,\Omega}$	$\lvert Z\rvert = \frac{Upp}{Ipp}$
[div]	[V/div]	[V]	[div]	[V/div]	[V]	[A]	[Ω]

C. Calculate the impedance of the capacitor:

$Z = \lvert Z\rvert e^{j\phi} = \ldots\ldots\ldots\ldots = R - jX = \ldots\ldots\ldots\ldots - j \ldots\ldots\ldots$

3. Determination of inductor impedance



Draw the currents and voltages
on the capacitor.

(measurement module M2 LR switch,
frequency f = 100kHz,
WE-voltage, WY-current).

Calculate:
A. Phase shift ϕ between voltage and current

Period *T*: [number of divisions]	Shift *tp* [Number of divisions]	Phase [$\phi = \frac{tp}{T} 360^o$]

B. Calculate the impedance module |Z|

Upp num. of div.	*Sensitivity*	*Upp*	*Ipp* num. of div.	*Sensitivity*	*UIpp*	$Ipp = \frac{UIpp}{10\,\Omega}$	$\lvert Z\rvert = \frac{Upp}{Ipp}$
[div]	[V/div]	[V]	[div]	[V/div]	[V]	[A]	[Ω]

C. Calculate inductor impedance:

$Z = \lvert Z\rvert e^{j\phi} = \ldots\ldots\ldots\ldots = R + jX = \ldots\ldots\ldots\ldots + j \ldots\ldots\ldots\ldots$