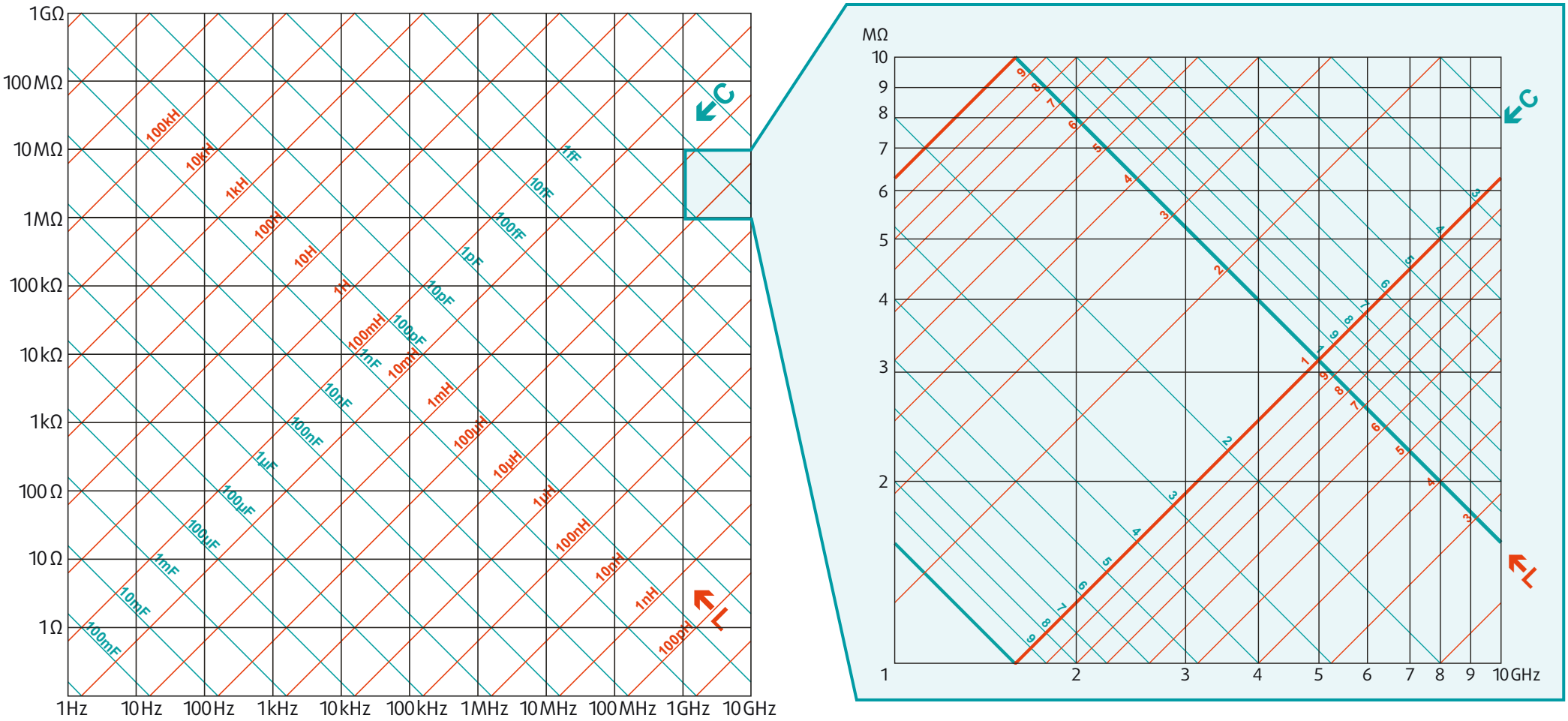
LRC DIAGRAM



PHYSICS FUNDAMENTALS

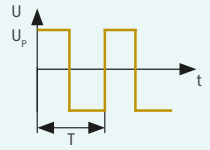
$U = R \cdot I$
$P = U \cdot I = I^2 \cdot R = U^2/R$
$I = C \cdot dU/dt$
$U = L \cdot dI/dt$
$Q = I \cdot t$
$W = ½ \cdot C \cdot U^2$
$W = ½ \cdot L \cdot I^2$
$Z_0 = \sqrt{L/C}$
$f_C = 1 / (2 \cdot \pi \cdot R \cdot C)$
$f_C = 1 / (2 \cdot \pi \cdot \sqrt{L \cdot C})$
$R_{Wire} = \rho_{20} \cdot (l / A)$
$\rho_{20}(Cu) = 0.0178\,\Omega \cdot mm^2/m$
$\rho_{20}(Al) = 0.0278\,\Omega \cdot mm^2/m$
$L = \mu_r \cdot \mu_0 \cdot N^2 \cdot A / l$
$\mu_0 = 1.256637061 \cdot 10^{-6}\ \frac{V \cdot s}{A \cdot m}$
$\mu_r(Fe) = 300 \ldots 10\,000$
$\mu_r(Ferrite) = 4 \ldots 15\,000$
$\mu_r(Air) = 1.0006$
$\mu_r(Vacuum) = 1$

TYPICAL INDUCTANCE AND CAPACITANCE OF A Z_0= 50 R COAXIAL CABLE

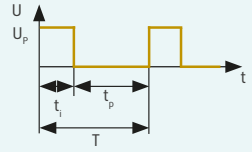
≈100 pF/m, ≈250 nH/m

EFFECTIVE VALUE FOR VOLTAGE

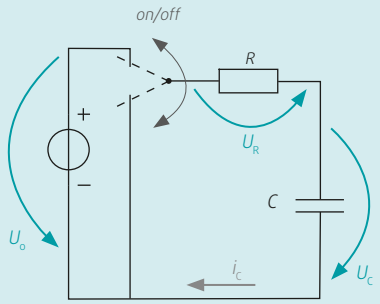
Sine $U_{eff} = U_p / \sqrt{2} = 0.707 \cdot U_p$
Triangular $U_{eff} = U_p / \sqrt{3} = 0.577 \cdot U_p$
Rectangular $U_{eff} = U_p / \sqrt{1} = 1.000 \cdot U_p$
(sym. bip.)



Rectangular $U_{eff} = U_p \cdot \sqrt{(ti/T)}$
(asym. unip.)



SWITCHING OPERATION OF CAPACITORS

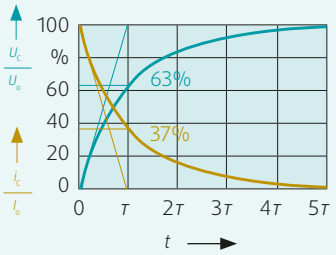


TIME CONSTANT

$\tau = R \cdot C$

$[\tau] = \Omega \cdot F = \Omega \cdot \frac{As}{V} = s$

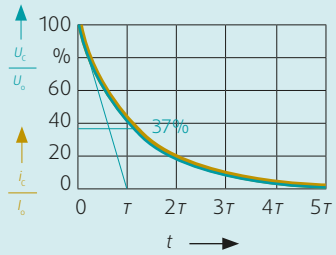
CHARGE



$U_C = U_o[1 - e^{(-t/\tau)}]$

$i_C = \frac{U_o}{R} \cdot e^{(-t/\tau)}$

DISCHARGE



$U_C = U_o \cdot e^{(-t/\tau)}$

$i_C = -\frac{U_o}{R} \cdot e^{(-t/\tau)}$

SCALE TRANSLATOR