

Q

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1024x1018 = 1024x1010



$$f = ma, \quad [\text{Newton}] = \frac{[\text{kilogram}][\text{meter}]}{[\text{second}]^2}$$

$$f = G \frac{m_1 m_2}{r^2}$$

ESPERADO





$$f = G \frac{Mm}{r^2} = gm$$

Q = G M r 2 = Q





$$f = k \frac{Q_1 Q_2}{r^2} = E Q_2$$

W E R O R E X I O

[Handwritten signature]

1991













$$w = fl = mg(h_2 - h_1), \quad g = \frac{w}{m(h_2 - h_1)}, \quad \frac{[Joule]}{[kilogram][meter]} = \frac{[Newton]}{[kilogram]} = \frac{[meter]}{[s]^2}$$









$$w = fl = qE(l_2 - l_1), \quad E = \frac{w}{q(l_2 - l_1)}, \quad \frac{[Joule]}{[Coulomb][meter]} = \frac{[Newton]}{[Coulomb]}$$

$$\dot{q} = \frac{dq}{dt},$$

$$q = \int \dot{q} dt, \quad [$$

$$] = \frac{[Coulomb]}{[second]}$$

$$q = \int i(t) dt = \int \mathbf{j} \cdot d\mathbf{A} dt$$

$$v = v - v_0 = \frac{w}{q} = \frac{Eq(l - l_0)}{q} = E(l - l_0), \quad [Volt] = \frac{[Joule]}{[Coulomb]}$$

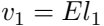














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$$E = \frac{v}{i} = \frac{qv}{qi} = \frac{w}{qj} = \frac{f}{q}$$

123456789







$$p = \frac{dw}{dt} = \frac{dw}{dq} \frac{dq}{dt} = v i, \quad [Watt] = \frac{[Joule]}{[second]} = \frac{[Joule]}{[Coulomb]} \frac{[Coulomb]}{[second]} = [Volt][Ampere]$$

$$w = \int p \, dt = \int vi \, dt, \quad [Joule] = [Watt][second] = [Volt][Ampere][second]$$





1000x2000=20x1000

$$v = qv_1 = qv_2 = qv_1$$

U.S. vs. E. J. 1

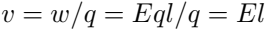
123456789

011

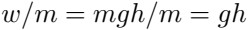


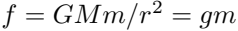
Q1 = Q2 - Q1 = Q2

Q = 1000











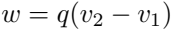
THE UNIVERSITY OF CHICAGO

[illegible]

Вопросы



$\sin \theta_1 = \sin \theta_2$









$$\Phi = \int B \cdot dA = |B| |A| \cos \alpha, \quad [Weber] = [Tesla][meter]^2$$









$$\mathbf{f} = q\mathbf{v} \times \mathbf{B}, \quad [\text{Newton}] = [\text{Coulomb}] \frac{[\text{meter}]}{[\text{second}]} [\text{Tesla}]$$

A row of ten pixelated, black and white symbols. From left to right, they are: a lowercase 't', an equals sign, a lowercase 'q', a lowercase 'e', a plus sign, a lowercase 'v', a lowercase 'x', a lowercase 'B', and a lowercase 'd'. The symbols are rendered in a low-resolution, dithered style.













$$R = \frac{V}{I} = \frac{v}{i}, \quad [Ohm] = \frac{[Volt]}{[Ampere]}, \quad \Omega = \frac{V}{A}$$





$$G = \frac{1}{R} = \frac{I}{V} = \frac{i}{v} \quad [Siemens] = \frac{1}{[Ohm]} = \frac{[Ampere]}{[Volt]}, \quad S = \frac{1}{\Omega} = \frac{A}{V}$$

[censored]

= 1/0.0001]







$$V = \frac{Q}{C},$$

$$Q = VC,$$

$$C = \frac{Q}{V}$$





W E O W

$$i(t) = \frac{dq(t)}{dt} = \frac{dq}{dv} \frac{dv}{dt} = C \frac{dv(t)}{dt}, \quad v(t) = \frac{q(t)}{C} = \frac{1}{C} \int_{-\infty}^t i(\tau) d\tau,$$



$$C = \frac{eA}{d} = \frac{e\epsilon_r A}{d}$$





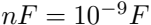


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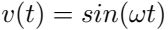


$$[F_{arad}] = \frac{[A_{mpere}][s_{econd}]}{[V_{olt}]} = \frac{[C_{oulomb}]}{[V_{olt}]}, \quad F = \frac{A \, s}{V} = \frac{C}{V}$$

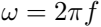
WAVE 10-05



10-12



$$i(t) = C \frac{dv(t)}{dt} = C \frac{d \sin(\omega t)}{dt} = \omega C \cos(\omega t)$$





WELCOME TO THE

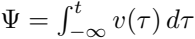


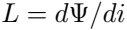






$$v(t) = \frac{d\Psi(t)}{dt} = \frac{d\Psi}{di} \frac{di}{dt} = L \frac{di}{dt}, \quad i(t) = \frac{1}{L} \int_{-\infty}^t v(\tau) d\tau = \frac{\Psi}{L}$$







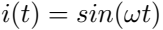
$$L = \frac{mN^2A}{l}$$





$$[Henry] = \frac{[Volt][second]}{[Ampere]}, \quad H = \frac{Vs}{A}$$

42-1061



$$v(t) = L \frac{di(t)}{dt} = L \frac{d \sin(\omega t)}{dt} = \omega L \cos(\omega t)$$











$$\left[\sqrt{\frac{L}{C}} \right] = \sqrt{\frac{[Henry]}{[Farad]}} = \sqrt{\frac{[Volt] [second]}{[Ampere]} \frac{[Volt]}{[second] [Ampere]}} = \frac{[Volt]}{[Ampere]} = [Ohm]$$

$$[\sqrt{LC}] = \sqrt{\frac{[Henry][Farad]}{[Ampere]}} = \sqrt{\frac{[Volt][second]}{[Ampere]}} = [second]$$



Resistor	$i = v/R = Gv$	$v = Ri = i/G$
Inductor	$i = \int v \, dt/L$	$v = L \, di/dt$
Capacitor	$i = C \, dv/dt$	$v = \int i \, dt/C$





$$v_1(t) = \frac{d\Psi_1}{dt} = N_1 \frac{d\Phi}{dt}, \quad v_2(t) = \frac{d\Psi_2}{dt} = N_2 \frac{d\Phi}{dt}$$

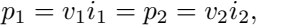
v_2

$=$

N_2

v_1

N_1

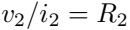


$$\frac{\dot{v}_1}{v_2} = \frac{v_2}{v_1} = \frac{N_2}{N_1}$$

$$v_2 = \frac{N_2}{N_1} v_1,$$

$$\dot{v}_2 = \frac{\dot{N}_1}{N_2} \dot{v}_1$$





$$\frac{v_1}{i_1} = \frac{(N_1/N_2)v_2}{(N_2/N_1)i_2} = \left(\frac{N_1}{N_2}\right)^2 \frac{v_2}{i_2} = \left(\frac{N_1}{N_2}\right)^2 R_L = R_L$$

$$p(t) = \frac{dw}{dt} = \frac{dw}{dq} \frac{dq}{dt} = v(t) i(t)$$

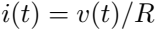




$$w = \int_0^T p(t) \, dt = \int_0^T v(t) \, i(t) \, dt$$





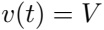


$$p(t) = v(t) i(t) = \frac{v^2(t)}{R} = i^2(t) R$$



$$w = \int_0^T p(t) dt = \int_0^T v(t) i(t) dt = \frac{1}{R} \int_0^T v^2(t) dt = R \int_0^T i^2(t) dt$$

www.oxoxo





$$P = VI = \frac{V^2}{R} = I^2 R$$

$$w = \int_0^T P \, dt = PT = VI T = \frac{V^2}{R} T = I^2 R T$$

Wiederherstellung

1. *Handwritten:* $\frac{1}{2} \pi$

123456789

$$w = \frac{1}{R} \int_0^T v^2(t) dt = \frac{V_p^2}{R} \int_0^T \sin^2(\omega t) dt = \frac{V_p^2}{2R} \int_0^T [1 - \cos(2\omega t)] dt = \frac{V_p^2}{2R} T$$



$$\frac{v_{rms}^2}{R}T = \frac{1}{R} \int_0^T v^2(t) dt = \frac{v_p^2}{2R}T$$

$$V_{rms} = \sqrt{\frac{1}{T} \int_0^T v^2(t) dt} = \frac{V_p}{\sqrt{2}} = 0.707 V_p$$



www

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vp

$$\sin \alpha \cos \alpha = \frac{1}{2} \sin 2\alpha, \quad \sin^2 \alpha = \frac{1}{2} [1 - \cos(2\alpha)], \quad \cos^2 \alpha = \frac{1}{2} [1 + \cos(2\alpha)]$$



$$I_{av}T = Q = \int_0^T i(t) dt,$$

$$I_{av} = \frac{1}{T} \int_0^T i(t) dt$$

$$v_{av} = \frac{1}{T} \int_0^T v(t) dt$$

$$i(t) = I_p \sin(\omega t) = I_p \sin(2\pi f t) = I_p \sin(2\pi t/T)$$







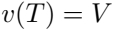


$$\frac{1}{T/2} \int_0^{T/2} i(t) \, dt = \frac{2}{T} \int_0^{T/2} I_p \sin(2\pi t/T) \, dt = -\frac{2}{T} \frac{T}{2\pi} I_p \cos(2\pi t/T) \Big|_0^{T/2}$$

$$\frac{I_p}{\pi} [\cos(0) - \cos(\pi)] = \frac{2}{\pi} I_p = 0.637 I_p$$

$$w = \int_0^T p(t) dt = \int_0^T v(t) i(t) dt = \int_0^T v(t) C \frac{dv(t)}{dt} dt = C \int_0^V v dv = \frac{1}{2} CV^2$$

000000



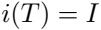
Handwritten text in a cursive script, likely a signature or name, rendered in a pixelated, black and white format. The text is written in a fluid, flowing style, characteristic of cursive handwriting. The characters are formed by thick, dark strokes, and the overall appearance is that of a digital or pixelated representation of a handwritten signature.



$$w = \int_0^T v(t) i(t) dt = V_p^2 \omega C \int_0^T \sin(\omega t) \cos(\omega t) dt = \frac{V_p^2 \omega C}{2} \int_0^T \sin(2\omega t) dt = 0$$

$$w = \int_0^T p(t) dt = \int_0^T i(t) v(t) dt = \int_0^T i(t) L \frac{di(t)}{dt} dt = L \int_0^T i di = \frac{1}{2} LI^2$$





Wiederholung

Handwritten text: $\frac{1}{2} \ln \frac{1}{2} = \frac{1}{2} \ln \frac{1}{2}$

$$w = \int_0^T v(t) i(t) dt = I_p^2 \omega L \int_0^T \sin(\omega t) \cos(\omega t) dt = \frac{I_p^2 \omega L}{2} \int_0^T \sin(2\omega t) dt = 0$$

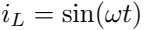




es ist ein

W E W O R D S

Wish you were



$$v = \frac{1}{2}cv^2$$

$$[Farad][volt]^2 = \frac{[Ampere][second]}{[volt]} [volt]^2$$

$$[Ampere][Volt][second] = [Volt][second] = [Joule]$$

$$v = \frac{1}{2} \ln 2$$

$$[Henry][Ampere]^2 = \frac{[Volt][second]}{[Ampere]} [Ampere]^2$$

$$[Mod][Ampere][second] = [Mod][second] = [Joule]$$



$$v = \frac{1}{2}mv^2, \quad \frac{[\text{kilogram}][\text{meter}]^2}{[\text{second}]^2} = [\text{joule}]$$







$$w = \frac{1}{2} C f^2, \quad \frac{\overset{[meter]}{[Newton]^2}}{\underset{[Newton]}{[Newton]}} = [meter][Newton] = [Joule]$$

$v = \int_0^x f(x) dx$









$$v = \int_0^X f(x) \, dx = \int_0^F f(c) \, df = \frac{1}{2} c F^2$$

$$w = \int_0^T f v(t) dt = \int_0^T m \frac{dv}{dt} v(t) dt = m \int_0^V v dv = \frac{1}{2} m V^2$$

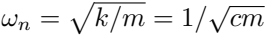




$$m \frac{d^2}{dt^2} x(t) + kx(t) = 0,$$

$$\frac{d^2}{dt^2}x(t) + \frac{k}{m}x(t) = \ddot{x} + \omega_n^2 x(t) = 0$$





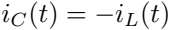


$$i\omega(t) = C \frac{dv(t)}{dt}, \quad v(t) = L \frac{di_L(t)}{dt}$$



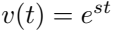


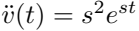
2020-2021



$$v(t) = I \frac{d}{dt} i_x(t) = I \frac{d}{dt} (-C \frac{dv}{dt}),$$

$$\frac{d^2 v(t)}{dt^2} + \frac{1}{LC} v(t) = \ddot{v}(t) + \omega_p^2 v(t) = 0$$





Es ist egal, ob

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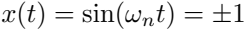
0



विद्यया ऽमृतमश्नुते

Handwritten text in a stylized, cursive script, likely a signature or name, rendered in black ink on a white background. The text is highly stylized and appears to be a mix of letters and symbols, possibly representing a name like "Eid" or "Eid" with decorative flourishes.

உள்ளேயே இருக்க வேண்டாம்
கொஞ்சம் வெளியே வர வேண்டும்



Wiederholung

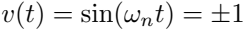
WELCOME TO

$$i(t) = \cos(\omega t) = \cos(\omega t) = \cos(\omega t)$$

W I

—
—

W I
W I



$\psi(t) = \psi(0) + \int_0^t \psi'(s) ds = 0$

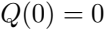


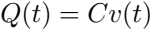
$$\frac{d^2x}{dt^2} + \frac{b}{m} \frac{dx}{dt} + \frac{k}{m} x = 0$$

$$\frac{d^2v}{dt^2} + \frac{R}{L} \frac{dv}{dt} + \frac{1}{LC} v = 0$$

$$p(t) = v(t) \dot{x}(t) = v(t) \frac{d}{dt} x(t)$$

$$v = \int_0^t P(\tau) d\tau = v(t)[Q(t) - Q(0)] = cv^2(t)$$





W E O W O

123456





I_k

$=$

0

k

$$\sum_k v_k = \sum_k V_k Q = 0, \quad \sum_k V_k = 0$$



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2020-2021

2023/12/20

2-11-12=1250, 11=05A

RAISE YOUR VOICE

3x2+5=11



$$IR_1 + \cdot \cdot \cdot + IR_n = IR$$

$$\frac{I}{G_1} + \dots + \frac{I}{G_n} = I \left(\frac{1}{G_1} + \dots + \frac{1}{G_n} \right) = \frac{I}{G_s}$$

$$R_s = \frac{V}{I} = R_1 + \dots + R_n$$

$$G_s = \frac{1}{R_s} = \frac{1}{V} = \frac{1}{1/G_1 + \dots + 1/G_n}$$



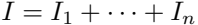


$$V_k = IR_k = \frac{V}{R_s} R_k = V \frac{R_k}{R_1 + R_2 + \dots + R_n}$$



$$V_1 = V \frac{R_1}{R_1 + R_2},$$

$$V_2 = V \frac{R_2}{R_1 + R_2}$$



$$\frac{V}{R_1} + \dots + \frac{V}{R_n} = V \left(\frac{1}{R_1} + \dots + \frac{1}{R_n} \right) = \frac{V}{R_p}$$

$$VG_1 + \cdot \cdot + VG_n = VG_1 + \cdot \cdot + VG_n = VG_n$$

$$R_p = \frac{V}{I} = \frac{1}{1/R_1 + \dots + 1/R_n} = R_1 || R_2 || \dots || R_n$$

$$G_p = \frac{1}{R_p} = \frac{I}{V} = G_1 + \dots + G_n = \frac{1}{R_p} = \frac{1}{R_1} + \dots + \frac{1}{R_n}$$

$$R_p = R_1 || R_2 = \frac{1}{1/R_1 + 1/R_2} = \frac{R_1 R_2}{R_1 + R_2}$$

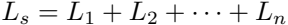


$$I_k = \frac{V}{R_k} = \frac{IR_p}{R_k} = I \frac{1/R_k}{1/R_1 + 1/R_2 + \cdots + 1/R_n} = I \frac{G_k}{G_1 + G_2 + \cdots + G_n}$$

$$I_1 = I \frac{G_1}{G_1 + G_2} = I \frac{1/R_1}{1/R_1 + 1/R_2} = I \frac{R_2}{R_1 + R_2}$$

$$I_2 = I \frac{G_2}{G_1 + G_2} = I \frac{1/R_2}{1/R_1 + 1/R_2} = I \frac{R_1}{R_1 + R_2}$$

$$v = v_1 + v_2 + \dots + v_n = L_1 \frac{di}{dt} + \dots + L_n \frac{di}{dt} = (L_1 + L_2 + \dots + L_n) \frac{di}{dt} = L_s \frac{di}{dt}$$



$$i = i_1 + i_2 + \cdots + i_n = \frac{1}{L_1} \int v \, dt + \cdots + \frac{1}{L_n} \int v \, dt = \left(\frac{1}{L_1} + \cdots + \frac{1}{L_n} \right) \int v \, dt = \frac{1}{L_p} \int v \, dt$$

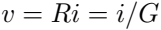
$$\frac{1}{Lp} = \frac{1}{L1} + \frac{1}{L} + \frac{1}{Lp}$$

$$i = i_1 + i_2 + \dots + i_n = C_1 \frac{dv}{dt} + \dots + C_n \frac{dv}{dt} = (C_1 + C_2 + \dots + C_n) \frac{dv}{dt} = C_p \frac{dv}{dt}$$

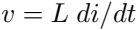
Q1 + Q2 + 3 + Q2 + 3

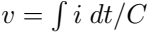
$$v = v_1 + v_2 + \cdots + v_n = \frac{1}{C_1} \int i \, dt + \cdots + \frac{1}{C_n} \int i \, dt = \left(\frac{1}{C_1} + \cdots + \frac{1}{C_n} \right) \int i \, dt = \frac{1}{C_s} \int i \, dt$$

$$\frac{1}{C_s} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \frac{1}{C_n}$$



W E I R D





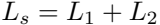
A pixelated, grayscale image of the letters 'E' and 'A'. The 'E' is on the left, and the 'A' is on the right. Both letters are composed of black and gray pixels on a white background, giving them a blocky, digital appearance.

A pixelated, grayscale image of the number 14. The digits are rendered in a blocky, low-resolution style using various shades of gray and black. The number 1 is on the left, and the number 4 is on the right. The overall appearance is reminiscent of early digital art or a low-quality scan of a printed number.

A large, stylized plus sign (+) is centered on a white background. The plus sign is formed by two intersecting bars. The horizontal bar is composed of several overlapping segments in shades of gray, with the central segment being the darkest. The vertical bar is also composed of overlapping segments in shades of gray, with the central segment being the darkest. The intersection of the two bars creates a darker, almost black square in the center. The overall effect is a soft, layered, and modern representation of a plus sign.

A pixelated, grayscale image of the letters 'E' and '9'. The 'E' is on the left, and the '9' is on the right. The image has a low-resolution, dithered appearance with various shades of gray and black pixels. The 'E' has a thick vertical stem and a horizontal crossbar. The '9' has a curved top and a short vertical tail. The overall style is reminiscent of early digital art or a low-quality scan of a printed document.

1995-1996



100% 100% 100%

Q

Q

Q1

+

Q2

123

45

678

90

123







$$\dot{v}_1 = \frac{R_2}{R_1 + R_2} \dot{v},$$

$$\dot{v}_2 = \frac{R_1}{R_1 + R_2} \dot{v}$$

$$\dot{v}_1 \equiv \frac{C_1}{C_1 + C_2} \dot{v},$$

$$\dot{v}_2 \equiv \frac{C_2}{C_1 + C_2} \dot{v}$$

$$\dot{v}_1 = \frac{\dot{v}_2}{\dot{v}_1 + \dot{v}_2},$$

$$\dot{v}_2 = \frac{\dot{v}_1}{\dot{v}_1 + \dot{v}_2}.$$

$$v_1 = \frac{R_1}{R_1 + R_2} v,$$

$$v_2 = \frac{R_2}{R_1 + R_2} v$$

$$v_1 = \frac{c_2}{c_1 + c_2} v,$$

$$v_2 = \frac{c_1}{c_1 + c_2} v$$

$$v_1 = \frac{L_1}{L_1 + L_2} v,$$

$$v_2 = \frac{L_2}{L_1 + L_2} v$$



1. 100%





W E I L E O P W







W E I A O

VOX

$$\begin{cases} \text{Source: } V = V_0 - IR_0 & (I = 0, V = V_0), \quad (V = 0, I = V_0/R_0) \\ \text{load: } V = R_L I \end{cases}$$

$$\begin{cases} I = V_0 / (R_0 + R_L) \\ V = R_L I = V_0 R_L / (R_0 + R_L) \end{cases}$$







1234567890

10

11

15

150

109

110

$$\begin{cases} \text{Source:} & I = I_0 - V/R_0 \quad (I = 0, V = R_0 I_0), \quad (V = 0, I = I_0) \\ \text{Load:} & I = V/R_L \end{cases}$$

$$\begin{cases} V = I_0 R_0 R_L / (R_0 + R_L) = I_0 R_0 || R_L \\ I = V / R_L = I_0 R_0 / (R_0 + R_L) \end{cases}$$









BEVERLY



VORRO I VORRO I

10, 11

VRIO = VRIO

Bo

—
—

Bo



WORLD OF



R_0

$=$

$$\frac{|\Delta V|}{|\Delta I|}$$





	Open circuit ($I = 0$)	Short circuit ($V = 0$)
Voltage Source	$V_{oc} = V_0$	$I_{sc} = V_0/R_0$
Current Source	$V_{oc} = I_0R_0$	$I_{sc} = I_0$

$$\frac{\text{open-circuit voltage}}{\text{short-circuit current}} = \frac{V_{oc}}{I_{sc}} = \left\{ \begin{array}{ll} V_o / (V_o / R_o) & \text{(voltage source)} \\ (I_o R_o) / I_o & \text{(current source)} \end{array} \right\} = R_o$$













10

10

10







1234567890

10 = 1000000









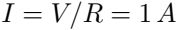
1234567890



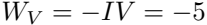








VR2R= VR2R= VR2R=











2020-2021

1923-1924

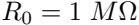
ARIZONA

FOR THE
SINCE

A horizontal sequence of 12 grayscale images showing the progression of a handwritten digit '0' from left to right. The first image shows a vertical stroke, followed by a horizontal stroke, and then the formation of the loop. The final image shows a complete, smooth '0'.

2024 + 10 = 2034





10

10

1000

10







$$R_0 = \frac{V_{oc}}{I_{sc}}$$





1000, Rev. 1000, Rev. 2000





12

—

12345

WORLDWIDE

12

—

2020

WORLDWIDE

$$V_0 \frac{1}{R_0 + 1} = 9.09,$$

$$V_0 \frac{2}{R_0 + 2} = 9.52$$

$$V_0 = 9.09 \text{ B} + 9.09, \quad V_1 = 4.76 \text{ B} + 9.52$$

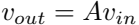
$$R_0 = \frac{9.52 - 9.09}{9.09 - 4.76} = \frac{0.43}{4.33} \approx 0.1 \, k\Omega$$

V09Bn+V09xO.1-V09=10V





100%









$$P_L = I^2 R_L = \left(\frac{V_0}{R_0 + R_L} \right)^2 R_L = V_0^2 \frac{R_L}{(R_0 + R_L)^2}$$



$$P_L = V_0^2 \frac{R_L}{(R_0 + R_L)^2} \xrightarrow{R_0 \rightarrow 0} \frac{V_0^2}{R_L}$$

$$\frac{d}{dR_L} P_L(R_L) = V_0^2 \frac{(R_0 + R_L)^2 - 2R_L(R_0 + R_L)}{(R_0 + R_L)^4} = V_0^2 \frac{R_0 - R_L}{(R_0 + R_L)^3} = 0$$



$$P_L = \frac{V_0^2}{(R_0 + R_L)^2} R_L \bigg|_{R_L = R_0} = \frac{V_0^2}{4R_0}$$

$$I = \frac{V_0}{R_0 + R_L} = \frac{V_0}{2R_0}$$

$$P_0 = V_0 I = \frac{V_0^2}{2R_0} = 2P_L$$







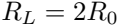


$$\eta = \frac{P_L}{P_0} = \frac{I^2 R_L}{I^2 (R_0 + R_L)} = \frac{R_L}{R_0 + R_L}$$

50%







$$\eta = \frac{R_L}{R_0 + R_L} \bigg|_{R_L = 2R_0} = \frac{2}{3} > \frac{1}{2}$$

$$P_L = I^2 R_L = \frac{V_0^2}{(R_0 + R_L)^2} R_L = V_0^2 \frac{2R_0}{(R_0 + 2R_0)^2} = \frac{2V_0^2}{9R_0} < \frac{V_0^2}{4R_0}$$





I

=

P
L

—

V
L

$$P_T = R_T I^2 = R_T \left(\frac{P_L}{V_L} \right)^2 = \frac{R_T P_L^2}{V_L^2}$$



