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AC Bridge Circuits Formulas

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List of 18 AC Bridge Circuits Formulas

AC Bridge Circuits 🔗

Anderson Bridge 🔗

1) Capacitor Current in Anderson Bridge 🔗

Open Calculator 🔗

fx $I_{c(ab)} = I_{1(ab)} \cdot \omega \cdot C_{(ab)} \cdot R_{3(ab)}$

ex $2.436A = 0.58A \cdot 200rad/s \cdot 420\mu F \cdot 50\Omega$

2) Unknown Inductance in Anderson Bridge 🔗

fx Open Calculator 🔗

$$L_{1(ab)} = C_{(ab)} \cdot \left(\frac{R_{3(ab)}}{R_{4(ab)}} \right) \cdot \left(\left(r_{1(ab)} \cdot \left(R_{4(ab)} + R_{3(ab)} \right) \right) + \left(R_{2(ab)} \cdot R_{4(ab)} \right) \right)$$

ex $546mH = 420\mu F \cdot \left(\dfrac{50\Omega}{150\Omega} \right) \cdot ((4.5\Omega \cdot (150\Omega + 50\Omega)) + (20\Omega \cdot 150\Omega))$

3) Unknown Resistance in Anderson Bridge 🔗

Open Calculator 🔗

fx $R_{1(ab)} = \left(\dfrac{R_{2(ab)} \cdot R_{3(ab)}}{R_{4(ab)}} \right) - r_{1(ab)}$

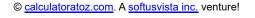ex $2.166667\Omega = \left(\dfrac{20\Omega \cdot 50\Omega}{150\Omega} \right) - 4.5\Omega$

De Sauty Bridge 🔗

4) Dissipation Factor of Known Capacitor in De Sauty Bridge 🔗

Open Calculator 🔗

fx $D_{2(dsb)} = \omega \cdot C_{2(dsb)} \cdot r_{2(dsb)}$

ex $0.5344 = 200rad/s \cdot 167\mu F \cdot 16\Omega$

5) Dissipation Factor of Unknown Capacitor in De Sauty Bridge ⚡

Open Calculator ⚡

fx $$D_{1(dsb)} = \omega \cdot C_{1(dsb)} \cdot r_{1(dsb)}$$

ex $$0.729106 = 200 \text{rad/s} \cdot 191.87 \mu\text{F} \cdot 19\Omega$$

6) Unknown Capacitance in De Sauty Bridge ⚡

Open Calculator ⚡

fx $$C_{1(dsb)} = C_{2(dsb)} \cdot \left(\frac{R_{4(dsb)}}{R_{3(dsb)}} \right)$$

ex $$191.8723 \mu\text{F} = 167 \mu\text{F} \cdot \left(\frac{54\Omega}{47\Omega} \right)$$

Hay Bridge ⚡

7) Quality Factor of Hay Bridge using Capacitance ⚡

Open Calculator ⚡

fx $$Q_{(hay)} = \frac{1}{C_{4(hay)} \cdot R_{4(hay)} \cdot \omega}$$

ex $$0.784929 = \frac{1}{260 \mu\text{F} \cdot 24.5\Omega \cdot 200 \text{rad/s}}$$

8) Unknown Inductance in Hay Bridge ⚡

Open Calculator ⚡

fx $$L_{1(hay)} = \frac{R_{2(hay)} \cdot R_{3(hay)} \cdot C_{4(hay)}}{1 + \omega^2 \cdot C_{4(hay)}^2 \cdot R_{4(hay)}^2}$$

ex $$109.4288 \text{mH} = \frac{32\Omega \cdot 34.5\Omega \cdot 260 \mu\text{F}}{1 + (200 \text{rad/s})^2 \cdot (260 \mu\text{F})^2 \cdot (24.5\Omega)^2}$$

9) Unknown Resistance of Hay Bridge ⎘

fx $$R_{1(hay)} = \frac{\omega^2 \cdot R_{2(hay)} \cdot R_{3(hay)} \cdot R_{4(hay)} \cdot C_{4(hay)}^2}{1 + \left(\omega^2 \cdot R_{4(hay)}^2 \cdot C_{4(hay)}^2\right)}$$

Open Calculator ⎘

ex $$27.88245\Omega = \frac{(200 \text{rad/s})^2 \cdot 32\Omega \cdot 34.5\Omega \cdot 24.5\Omega \cdot (260\mu F)^2}{1 + \left((200 \text{rad/s})^2 \cdot (24.5\Omega)^2 \cdot (260\mu F)^2\right)}$$

Maxwell Bridge ⎘

10) Quality Factor of Maxwell Inductance-Capacitance Bridge ⎘

fx $$Q_{(max)} = \frac{\omega \cdot L_{1(max)}}{R_{eff(max)}}$$

Open Calculator ⎘

ex $$0.501092 = \frac{200 \text{rad/s} \cdot 32.571 \text{mH}}{13\Omega}$$

11) Unknown Inductance in Maxwell Inductance Bridge ⎘
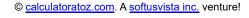
fx $$L_{1(max)} = \left(\frac{R_{3(max)}}{R_{4(max)}}\right) \cdot L_{2(max)}$$

Open Calculator ⎘

ex $$32.57143 \text{mH} = \left(\frac{12\Omega}{14\Omega}\right) \cdot 38 \text{mH}$$

12) Unknown Resistance in Maxwell Inductance Bridge ⎘

fx $$R_{1(max)} = \left(\frac{R_{3(max)}}{R_{4(max)}}\right) \cdot \left(R_{2(max)} + r_{2(max)}\right)$$

Open Calculator ⎘

ex $$110.5714\Omega = \left(\frac{12\Omega}{14\Omega}\right) \cdot (29\Omega + 100\Omega)$$

Schering Bridge 🔗

13) Dissipation Factor in Schering Bridge 🔗

fx $D_{1(sb)} = \omega \cdot C_{4(sb)} \cdot R_{4(sb)}$

Open Calculator 🔗

ex $0.6104 = 200rad/s \cdot 109\mu F \cdot 28\Omega$

14) Unknown Capacitance in Schering Bridge 🔗

fx $C_{1(sb)} = \left(\dfrac{R_{4(sb)}}{R_{3(sb)}} \right) \cdot C_{2(sb)}$

Open Calculator 🔗

ex $183.3548\mu F = \left(\dfrac{28\Omega}{31\Omega} \right) \cdot 203\mu F$

15) Unknown Resistance in Schering Bridge 🔗

fx $r_{1(sb)} = \left(\dfrac{C_{4(sb)}}{C_{2(sb)}} \right) \cdot R_{3(sb)}$

Open Calculator 🔗

ex $16.64532\Omega = \left(\dfrac{109\mu F}{203\mu F} \right) \cdot 31\Omega$

Wien Bridge 🔗

16) Angular Frequency in Wien's Bridge 🔗

fx $\omega_{(wein)} = \dfrac{1}{\sqrt{R_{1(wein)} \cdot R_{2(wein)} \cdot C_{1(wein)} \cdot C_{2(wein)}}}$

Open Calculator 🔗

ex $138.5107rad/s = \dfrac{1}{\sqrt{27\Omega \cdot 26\Omega \cdot 270\mu F \cdot 275\mu F}}$

17) Resistance Ratio in Wien Bridge 🔗

Open Calculator ⬀

$$\text{fx} \quad \text{RR}_{(\text{wein})} = \left(\frac{\text{R}_{2(\text{wein})}}{\text{R}_{1(\text{wein})}} \right) + \left(\frac{\text{C}_{1(\text{wein})}}{\text{C}_{2(\text{wein})}} \right)$$

$$\text{ex} \quad 1.944781 = \left(\frac{26\Omega}{27\Omega} \right) + \left(\frac{270\mu\text{F}}{275\mu\text{F}} \right)$$

18) Unknown Frequency in Wien Bridge 🔗

Open Calculator ⬀

$$\text{fx} \quad \text{f}_{(\text{wein})} = \frac{1}{2 \cdot \pi \cdot \left(\sqrt{\text{R}_{1(\text{wein})} \cdot \text{R}_{2(\text{wein})} \cdot \text{C}_{1(\text{wein})} \cdot \text{C}_{2(\text{wein})}} \right)}$$

$$\text{ex} \quad 22.04466\text{Hz} = \frac{1}{2 \cdot \pi \cdot \left(\sqrt{27\Omega \cdot 26\Omega \cdot 270\mu\text{F} \cdot 275\mu\text{F}} \right)}$$

Variables Used

- $C_{(ab)}$ Capacitance in Anderson Bridge *(Microfarad)*
- $C_{1(dsb)}$ Unknown Capacitance in De Sauty Bridge *(Microfarad)*
- $C_{1(sb)}$ Unknown Capacitance in Schering Bridge *(Microfarad)*
- $C_{1(wein)}$ Known Capacitance 1 in Wein Bridge *(Microfarad)*
- $C_{2(dsb)}$ Known Capacitance in De Sauty Bridge *(Microfarad)*
- $C_{2(sb)}$ Known Capacitance 2 in Schering Bridge *(Microfarad)*
- $C_{2(wein)}$ Known Capacitance 2 in Wein Bridge *(Microfarad)*
- $C_{4(hay)}$ Capacitance in Hay Bridge *(Microfarad)*
- $C_{4(sb)}$ Known Capacitance 4 in Schering Bridge *(Microfarad)*
- $D_{1(dsb)}$ Dissipation Factor 1 in De Sauty Bridge
- $D_{1(sb)}$ Dissipation Factor in Schering Bridge
- $D_{2(dsb)}$ Dissipation Factor 2 in De Sauty Bridge
- $f_{(wein)}$ Unknown Frequency in Wein Bridge *(Hertz)*
- $I_{1(ab)}$ Inductor Current in Anderson Bridge *(Ampere)*
- $I_{c(ab)}$ Capacitor Current in Anderson Bridge *(Ampere)*
- $L_{1(ab)}$ Unknown Inductance in Anderson Bridge *(Millihenry)*
- $L_{1(hay)}$ Unknown Inductance in Hay Bridge *(Millihenry)*
- $L_{1(max)}$ Unknown Inductance in Maxwell Bridge *(Millihenry)*
- $L_{2(max)}$ Variable Inductance in Maxwell Bridge *(Millihenry)*
- $Q_{(hay)}$ Quality Factor in Hay Bridge
- $Q_{(max)}$ Quality Factor in Maxwell Bridge
- $r_{1(ab)}$ Series Resistance in Anderson Bridge *(Ohm)*
- $R_{1(ab)}$ Inductor Resistance in Anderson Bridge *(Ohm)*
- $r_{1(dsb)}$ Capacitor 1 Resistance in De Sauty Bridge *(Ohm)*
- $R_{1(hay)}$ Unknown Resistance in Hay Bridge *(Ohm)*
- $R_{1(max)}$ Unknown Resistance in Maxwell Bridge *(Ohm)*

- $r_{1(sb)}$ Series Resistance 1 in Schering Bridge *(Ohm)*
- $R_{1(wein)}$ Known Resistance 1 in Wein Bridge *(Ohm)*
- $R_{2(ab)}$ Known Resistance 2 in Anderson Bridge *(Ohm)*
- $r_{2(dsb)}$ Capacitor 2 Resistance in De Sauty Bridge *(Ohm)*
- $R_{2(hay)}$ Known Resistance 2 in Hay Bridge *(Ohm)*
- $r_{2(max)}$ Decade Resistance in Maxwell Bridge *(Ohm)*
- $R_{2(max)}$ Variable Resistance in Maxwell Bridge *(Ohm)*
- $R_{2(wein)}$ Known Resistance 2 in Wein Bridge *(Ohm)*
- $R_{3(ab)}$ Known Resistance 3 in Anderson Bridge *(Ohm)*
- $R_{3(dsb)}$ Known Resistance 3 in De Sauty Bridge *(Ohm)*
- $R_{3(hay)}$ Known Resistance 3 in Hay Bridge *(Ohm)*
- $R_{3(max)}$ Known Resistance 3 in Maxwell Bridge *(Ohm)*
- $R_{3(sb)}$ Known Resistance 3 in Schering Bridge *(Ohm)*
- $R_{4(ab)}$ Known Resistance 4 in Anderson Bridge *(Ohm)*
- $R_{4(dsb)}$ Known Resistance 4 in De Sauty Bridge *(Ohm)*
- $R_{4(hay)}$ Known Resistance 4 in Hay Bridge *(Ohm)*
- $R_{4(max)}$ Known Resistance 4 in Maxwell Bridge *(Ohm)*
- $R_{4(sb)}$ Known Resistance 4 in Schering Bridge *(Ohm)*
- $R_{eff(max)}$ Effective Resistance in Maxwell Bridge *(Ohm)*
- $RR_{(wein)}$ Resistance Ratio in Wein Bridge
- ω Angular Frequency *(Radian per Second)*
- $\omega_{(wein)}$ Angular Frequency in Wein Bridge *(Radian per Second)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Function: **sqrt**, sqrt(Number)
  Square root function
- Measurement: **Electric Current** in Ampere (A)
  Electric Current Unit Conversion 📲
- Measurement: **Frequency** in Hertz (Hz)
  Frequency Unit Conversion 📲
- Measurement: **Capacitance** in Microfarad (μF)
  Capacitance Unit Conversion 📲
- Measurement: **Electric Resistance** in Ohm (Ω)
  Electric Resistance Unit Conversion 📲
- Measurement: **Inductance** in Millihenry (mH)
  Inductance Unit Conversion 📲
- Measurement: **Angular Frequency** in Radian per Second (rad/s)
  Angular Frequency Unit Conversion 📲

Check other formula lists

- **AC Bridge Circuits Formulas**

- **DC Bridges Formulas**

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