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Electric Circuits I

Cheat Sheet

Electric Circuits I

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Electric Circuits II

Cheat Sheet

Electric Circuits II

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Electromagnetics

Cheat Sheet

Electromagnetics

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Electronics I

Cheat Sheet

Electronics I

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Electronics II

Cheat Sheet

Electronics II

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Fourier Series: Period-Shift Integral Property

If f is periodic with period $2p$ (i.e., $f(t + 2p) = f(t)$), then for any $d \in \mathbb{R}$,

$$\int_d^{d+2p} f(t) dt = \int_0^{2p} f(t) dt.$$

Proof: Let $u = t - d$. Then

$$\int_d^{d+2p} f(t) dt = \int_0^{2p} f(u + d) du.$$

Set $g(u) = f(u + d)$. Since f is $2p$ -periodic, g is also $2p$ -periodic, hence

$$\int_0^{2p} g(u) du = \int_0^{2p} f(u) du,$$

so

$$\int_d^{d+2p} f(t) dt = \int_0^{2p} f(u) du.$$

Integration by Parts

$$\int u dv = uv - \int v du.$$

Exponential-Trigonometric Integrals

For $a, b \in \mathbb{R}$ with $a^2 + b^2 \neq 0$,

$$\int e^{ax} \cos(bx) dx = \frac{e^{ax}}{a^2 + b^2} (a \cos(bx) + b \sin(bx)) + C,$$

$$\int e^{ax} \sin(bx) dx = \frac{e^{ax}}{a^2 + b^2} (a \sin(bx) - b \cos(bx)) + C.$$

Signal and System

Cheat Sheet

Signal and System

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