

Contents

1	Electric Circuits I	2
1.1	2
1.2	Cheat Sheet	2
2	Electric Circuits I	2
3	Electric Circuits II	3
3.1	3
3.2	Cheat Sheet	3
4	Electric Circuits II	3
5	Electromagnetics	4
5.1	4
5.2	Cheat Sheet	4
6	Electromagnetics	4
7	Electronics I	5
7.1	5
7.2	Cheat Sheet	5
8	Electronics I	5
9	Electronics II	6
9.1	6
9.2	Cheat Sheet	6
10	Electronics II	6
10.1	Fourier Series: Period-Shift Integral Property	7
10.2	Integration by Parts	7
10.3	Exponential-Trigonometric Integrals	7
11	Signal and System	8
11.1	8
11.2	Cheat Sheet	8
12	Signal and System	8

Electric Circuits I

Cheat Sheet

Electric Circuits I

Electric Circuits II

Cheat Sheet

Electric Circuits II

Electromagnetics

Cheat Sheet

Electromagnetics

Electronics I

Cheat Sheet

Electronics I

Electronics II

Cheat Sheet

Electronics II

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