APÊNDICE 1

RELAÇÕES TRIGONOMÉTRICAS

1. $\text{sen } x = \cos\left(\frac{\pi}{2} - x\right)$

2. $\cos x = \text{sen}\left(\frac{\pi}{2} - x\right)$

3. $\text{tg } x = \frac{\text{sen } x}{\cos x}$

4. $\cot g\ x = \frac{\cos x}{\text{sen } x}$

5. $\sec x = \frac{1}{\cos x}$

6. $\text{cosec } x = \frac{1}{\text{sen } x}$

7. $\text{sen}^2 x + \cos^2 x = 1$

8. $\text{sen } (-x) = -\text{sen } x \ \ \therefore \ \ \cos(-x) = \cos x$

9. $\text{sen } (x \pm y) = \text{sen } x \ \cos y \pm \cos x \ \text{sen } y$

10. $\cos(x \pm y) = \cos x \ \cos y \mp \text{sen } x \ \text{sen } y$

11. $\text{tg } (x \pm y) = \frac{\text{tg } x \pm \text{tg } y}{1 \mp \text{tg } x \ \text{tg } y}$

12. $A\cos x + B\,\text{sen } x = \sqrt{A^2 + B^2}\ \text{sen}(x + \alpha)$ onde $\text{tg}\,\alpha = \frac{A}{B}$

APÊNDICE 2

DIFERENCIAÇÕES

1. $\frac{d}{dx}(u \pm V) = \frac{du}{dx} \pm \frac{dV}{dx}$

2. $\frac{d}{dx}(c\,u) = c\frac{du}{dx}$

3. $\frac{d}{dx}(u\,V) = u\frac{dV}{dx} + V\frac{dV}{dx}$

4. $\frac{d}{dx}\left(\frac{u}{V}\right) = \frac{V\,du/dx - u\,dV/dx}{V^2}$

5. $\frac{d}{dx}\left(u^p\right) = p\,u^{p-1}\frac{du}{dx}$

6. $\frac{d}{dx}\left(a^u\right) = a^u \ln a$

7. $\frac{d}{dx}\left(e^u\right) = e^u\frac{du}{dx}$

8. $\frac{d}{dx}(\ln u) = \frac{1}{u}\frac{du}{dx}$

9. $\frac{d}{dx}(\operatorname{sen} u) = \cos u\frac{du}{dx}$

10. $\frac{d}{dx}(\cos u) = -\operatorname{sen} u\frac{du}{dx}$

11. $\frac{d}{dx}(\operatorname{tg} u) = \sec^2 u\frac{du}{dx}$

12. $\frac{d}{dx}(\operatorname{cot g} u) = -\operatorname{cosec}^2 u\frac{du}{dx}$

APÊNDICE 3

INTEGRAÇÕES

1. $\int (u \pm V)\,dx = \int u\,dx \pm \int V\,dx$

2. $\int (c\,u)\,dx = c\int u\,dx$

3. $\int \left(u\,\frac{dV}{dx}\right)dx = u\,V - \int \left(V\,\frac{du}{dx}\right)dx$

4. $\int \left(u^{p}\right)du = \frac{u^{p+1}}{p+1}\ ,\ p \neq -1$

5. $\int \left(u^{-1}\right)du = \ln u$

6. $\int \left(a^{u}\right)du = \frac{a^{u}}{\ln a}\ ,\ a \neq 0,1$

7. $\int \left(e^{u}\right)du = e^{u}$

8. $\int (\text{sen } u)\,du = -\cos u$

9. $\int (\cos u)\,du = \text{sen } u$

10. $\int (\text{tg } u)\,du = -\ln(\cos u)$

11. $\int (\text{cot g } u)\,du = \ln(\text{sen } u)$

12. $\int \left(e^{au}\,\text{sen}\,bu\right)du = \frac{e^{au}\,(a\,\text{sen}\,bu - b\,\cos bu)}{a^{2}+b^{2}}$

13. $\int \left(e^{au}\cos bu\right)du = \frac{e^{au}\,(a\cos bu + b\,\text{sen}\,bu)}{a^{2}+b^{2}}$

APÊNDICE 4

TRANSFORMADA DE LAPLACE

	f(t)	F(s)
1.	A	$\frac{A}{s}$
2.	$A\,t$	$\frac{A}{s^2}$
3.	$e^{-a\,t}$	$\frac{1}{(s+a)}$
4.	$t\,e^{-a\,t}$	$\frac{1}{(s+a)^2}$
5.	$\text{sen}(\omega\,t)$	$\frac{\omega}{\left(s^2+\omega^2\right)}$
6.	$\cos(\omega\,t)$	$\frac{s}{\left(s^2+\omega^2\right)}$
7.	$\text{sen}(\omega\,t+\phi)$	$\frac{s\cdot\text{sen}\,\phi+\omega\cdot\cos\phi}{\left(s^2+\omega^2\right)}$
8.	$\cos(\omega\,t+\phi)$	$\frac{s\cdot\cos\phi-\omega\cdot\text{sen}\,\phi}{\left(s^2+\omega^2\right)}$
9.	$e^{-a\,t}\,\text{sen}(\omega\,t)$	$\frac{\omega}{\left((s+a)^2+\omega^2\right)}$
10.	$e^{-a\,t}\cos(\omega\,t)$	$\frac{(s+a)}{\left((s+a)^2+\omega^2\right)}$
11.	$\frac{d\,f(t)}{dt}$	$s\,F(s)-f(0^+)$
12.	$\int f(t)\,dt$	$\frac{F(s)}{s}+\frac{\int f(t)\,dt\,\Big\vert_{\,t=0^+}}{s}$
13.	$f(t-t_1)$	$e^{-t_1\,s}\cdot F(s)$
14.	$f_1(t)+f_2(t)$	$F_1(s)+F_2(s)$
15.	$\frac{d^2\,f(t)}{dt^2}$	$s^2\,F(s)-s\,f(0^+)-f'(0^+)$

APÊNDICE 5

CURVAS