

Formulário para Análise Matemática I

Electrónica e Computadores ♦ Sistemas Eléctricos de Energia

02/03

Nas regras apresentadas a seguir, os símbolos u , e v representam funções na variável x . As letras a , b , c , k e α , são constantes reais. A base natural dos logaritmos, \ln , é simbolizada pela letra e .

1. Tabela de derivadas	2. Tabela de integrais
1. $(u \cdot v)' = u' \cdot v + v' \cdot u$	1. $\int u' \cdot u^n dx = \frac{1}{n+1} u^{n+1} + c, \quad n \neq -1$
2. $\left(\frac{u}{v}\right)' = \frac{u' \cdot v - v' \cdot u}{v^2}$	2. $\int \frac{u'}{u} dx = \ln u + c$
3. $(u^n)' = n \cdot u^{n-1} \cdot u'$	3. $\int u' \cdot e^u dx = e^u + c$
4. $(\operatorname{senu})' = u' \cdot \cos u$	4. $\int u' \cdot a^u dx = \frac{a^u}{\ln a} + c$
5. $(\cos u)' = -u' \cdot \operatorname{senu}$	5. $\int u' \cdot \operatorname{sen} u dx = -\cos u + c$
6. $(\operatorname{tgu})' = u' \cdot \sec^2 u$	6. $\int u' \cdot \cos u dx = \operatorname{sen} u + c$
7. $(\operatorname{cotgu})' = -u' \cdot \operatorname{cosec}^2 u$	7. $\int u' \cdot \operatorname{tg} u dx = -\ln \cos u + c$
8. $(\operatorname{secu})' = u' \cdot \operatorname{secu} \cdot \operatorname{tgu}$	8. $\int u' \cdot \operatorname{cotg} u dx = \ln \operatorname{sen} u + c$
9. $(\operatorname{cosecu})' = -u' \cdot \operatorname{cosecu} \cdot \operatorname{cotgu}$	9. $\int u' \cdot \sec^2 u dx = \operatorname{tg} u + c$
10. $(\operatorname{arcsenu})' = \frac{u'}{\sqrt{1-u^2}}$	10. $\int u' \cdot \operatorname{cosec}^2 u dx = -\operatorname{cotg} u + c$
11. $(\operatorname{arccos} u)' = \frac{-u'}{\sqrt{1-u^2}}$	11. $\int \frac{u'}{1+u^2} dx = \operatorname{arc} \operatorname{tg} u + c$
12. $(\operatorname{arctgu})' = \frac{u'}{1+u^2}$	12. $\int \frac{u'}{\sqrt{1-u^2}} dx = \operatorname{arc} \operatorname{sen} u + c$
13. $(\operatorname{arccotgu})' = \frac{-u'}{1+u^2}$	13. $\int u' \cdot \sec u dx = \ln \sec u + \operatorname{tg} u + c$
14. $(a^u)' = u' \cdot a^u \cdot \ln a$	14. $\int u' \cdot \operatorname{cosec} u dx = \ln \operatorname{cosec} u - \operatorname{cotg} u + c$
15. $(e^u)' = u' \cdot e^u$	15. $\int \frac{u'}{u \cdot \sqrt{u^2-1}} dx = \operatorname{arc} \sec u + c$
16. $(\log_a u)' = \frac{u'}{u \cdot \ln a}$	16. $\int u \cdot v' dx = u \cdot v - \int v \cdot u' dx$
17. $(\ln u)' = \frac{u'}{u}$	
18. $(u^v)' = v \cdot u^{v-1} \cdot u' + v' \cdot u^v \cdot \ln u$	

3. Fórmulas trigonométricas

3.1 Fórmulas fundamentais

1. $\sin^2 x + \cos^2 x = 1$
2. $1 + \operatorname{tg}^2 x = \sec^2 x$
3. $1 + \operatorname{cotg}^2 x = \operatorname{cosec}^2 x$

3.2 Fórmulas de adição

4. $\sin(a \pm b) = \sin a \cdot \cos b \pm \cos a \cdot \sin b$
5. $\cos(a \pm b) = \cos a \cdot \cos b \mp \sin a \cdot \sin b$
6. $\operatorname{tg}(a \pm b) = \frac{\operatorname{tg} a \pm \operatorname{tg} b}{1 \mp \operatorname{tg} a \cdot \operatorname{tg} b}$
7. $\operatorname{cotg}(a \pm b) = \frac{\operatorname{cotg} a \cdot \operatorname{cotg} b \mp 1}{\operatorname{cotg} a \pm \operatorname{cotg} b}$

3.3 Fórmulas de duplicação

8. $\sin(2a) = 2 \sin a \cdot \cos a$
9. $\cos(2a) = \cos^2 a - \sin^2 a$
 $= 2 \cos^2 a - 1 = 1 - 2 \sin^2 a$
10. $\operatorname{tg}(2a) = \frac{2 \operatorname{tg} a}{1 - \operatorname{tg}^2 a}$
11. $\operatorname{cotg}(2a) = \frac{\operatorname{cotg}^2 a - 1}{2 \operatorname{cotg} a}$

3.4 Fórmulas de bissecção

12. $\sin^2 a = \frac{1 - \cos 2a}{2}$
13. $\cos^2 a = \frac{1 + \cos 2a}{2}$
14. $\operatorname{tg}^2 a = \frac{1 - \cos 2a}{1 + \cos 2a}$

3.5 Fórmulas de transformação

13. $\sin a \pm \sin b = 2 \sin \frac{a \pm b}{2} \cdot \cos \frac{a \mp b}{2}$
14. $\cos a + \cos b = 2 \cos \frac{a+b}{2} \cdot \cos \frac{a-b}{2}$
15. $\cos a - \cos b = -2 \sin \frac{a+b}{2} \cdot \sin \frac{a-b}{2}$
16. $\sin a \cdot \sin b = \frac{1}{2} [\cos(a-b) - \cos(a+b)]$
17. $\cos a \cdot \cos b = \frac{1}{2} [\cos(a-b) + \cos(a+b)]$
18. $\sin a \cdot \cos b = \frac{1}{2} [\sin(a+b) + \sin(a-b)]$

4. Algumas funções hiperbólicas

1. $\sinh(at) = \frac{e^{at} - e^{-at}}{2}$
2. $\cosh(at) = \frac{e^{at} + e^{-at}}{2}$