Formuleblad

te gebruiken bij de

tentamens analyse

van het

instellingspakket TU Delft

Enkele goniometrische formules

1. $\sin(2\alpha) = 2\sin\alpha\cos\alpha$
2. $\cos(2\alpha) = 2\cos^2\alpha - 1 = 1 - 2\sin^2\alpha = \cos^2\alpha - \sin^2\alpha$

Enkele limieten

3. $\lim\limits_{x\to\infty} \dfrac{x^p}{e^x} = 0$
4. $\lim\limits_{x\to\infty} \left(1 + \dfrac{a}{x}\right)^x = e^a$
5. $\lim\limits_{x\to\infty} \dfrac{\ln x}{x^p} = 0 \ (p > 0)$

Enkele Taylorreeksen

6. $\sin x = x - \dfrac{x^3}{3!} + \dfrac{x^5}{5!} - \dfrac{x^7}{7!} + \cdots \qquad (x \in \mathbb{R})$
7. $\cos x = 1 - \dfrac{x^2}{2!} + \dfrac{x^4}{4!} - \dfrac{x^6}{6!} + \cdots \qquad (x \in \mathbb{R})$
8. $\ln(1+x) = x - \dfrac{x^2}{2} + \dfrac{x^3}{3} - \dfrac{x^4}{4} + \dfrac{x^5}{5} - \cdots \qquad (-1 < x \leq 1)$
9. $(1+x)^k = 1 + kx + \dfrac{k(k-1)}{2!}x^2 + \dfrac{k(k-1)(k-2)}{3!}x^3 + \cdots \quad (-1 < x < 1)$

Enkele integralen

10. $\displaystyle\int \frac{dx}{\sin x} = \ln\left|\tan\frac{x}{2}\right| + C$
11. $\displaystyle\int \frac{dx}{\cos x} = \ln\left|\tan\left(\frac{x}{2} + \frac{\pi}{4}\right)\right| + C$

12. $\displaystyle\int \frac{dx}{1+x^2} = \arctan x + C$

13. $\displaystyle\int \frac{dx}{1-x^2} = \frac{1}{2}\ln\left|\frac{1+x}{1-x}\right| + C$

14. $\displaystyle\int \frac{dx}{\sqrt{1-x^2}} = \arcsin x + C$

15. $\displaystyle\int \frac{dx}{\sqrt{x^2+1}} = \ln(x+\sqrt{x^2+1}) + C$

16. $\displaystyle\int \frac{dx}{\sqrt{x^2-1}} = \ln\left|x+\sqrt{x^2-1}\right| + C$

17. $\displaystyle\int \sqrt{1+x^2}\,dx = \frac{1}{2}x\sqrt{1+x^2} + \frac{1}{2}\ln(x+\sqrt{1+x^2}) + C$

18. $\displaystyle\int \sqrt{1-x^2}\,dx = \frac{1}{2}x\sqrt{1-x^2} + \frac{1}{2}\arcsin x + C$

19. $\displaystyle\int_0^{\frac{\pi}{2}} \sin^n x\,dx = \begin{cases} \dfrac{n-1}{n}\dfrac{n-3}{n-2}\dfrac{n-5}{n-4}\cdots\dfrac{3}{4}\dfrac{1}{2}\dfrac{\pi}{2} & \text{indien } n \text{ even en } n \geq 2 \\ \dfrac{n-1}{n}\dfrac{n-3}{n-2}\dfrac{n-5}{n-4}\cdots\dfrac{4}{5}\dfrac{2}{3} & \text{indien } n \text{ oneven en } n \geq 3 \end{cases}$