

Beispiel 4: Cael Tschobokdji

• Aufg: $\int \frac{4x^2 + 9x - 4}{x^3 - 5x^2 + 8x - 4} dx \rightarrow \int \frac{A}{x-1} + \frac{B}{x-2} + \frac{C}{(x-2)^2} dx$

$\underbrace{x^3 - 5x^2 + 8x - 4}_{(x-1)(x-2)^2}$

$= \int \frac{(x^2 - 4x + 4)A + B(x-2)(x-1) + C(x-1)}{(x-1)(x-2)^2} dx$

$$\begin{array}{l} 4 = A + B \\ 9 = -4A + 2B + C \\ -4 = 4A + 2B - C \end{array} \quad \begin{array}{l} \text{II} + \text{III} \\ \hline 5 = 4C \end{array} \quad \left. \begin{array}{l} 4 = A + B \\ 5 = 4C \\ -4 = 4A + 2B - C \end{array} \right\} \begin{array}{l} A = \frac{11}{4} \\ B = \frac{5}{4} \\ C = 6.75 \end{array}$$

$$\int \frac{11/4}{x-1} + \frac{5/4}{x-2} + \frac{27/4}{(x-2)^2} dx$$

$g(x) = x-2 \quad \frac{dx}{dg} = 1$
 $dx = dg$

$\Rightarrow \frac{11}{4} \cdot \ln|x-1| + \frac{5}{4} \cdot \ln|x-2| - 13.5 (x-2)^{-3} + C$

$= \ln|6^{-1}| \cdot \frac{11}{4} \cdot (x-2)^{\frac{5}{4}} - 13.5 (x-2)^{-3} + C$

$L \Rightarrow \frac{27}{4} \int \frac{1}{g^2} dg$

$\Leftrightarrow \frac{27}{4} \int g^{-2} dg$

$\Leftrightarrow \frac{27}{4} \cdot -2 g^{-3}$

\downarrow

$\frac{27}{4} \cdot -2 (x-2)^{-3} + C$

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