$$3.2.\ \frac{e^x - 1}{x} = \frac{\cancel{1} + x + \frac{x^2}{2} + \frac{x^3}{6} + \dots - \cancel{1}}{x} =$$

$$= 1 + \frac{x}{2} + \frac{x^2}{6} + \dots + \frac{x^n}{n!}$$

$$R_T = \left| \cancel{1} + \frac{x}{2} + \underbrace{\frac{x^2}{6} + \dots + \frac{x^n}{n!}}_{O} - \cancel{1} \right| \approx \frac{x}{2}$$

$$3.3.\ f(x) = \frac{e^x - 1}{x} = \frac{a-1}{x} = \frac{b}{x} = c$$

$$\left|\frac{\Delta a}{a}\right|, \left|\frac{\Delta b}{b}\right|, \left|\frac{\Delta c}{c}\right| \leq \mu$$

$$|\Delta f| \lessapprox \left|\frac{\partial f}{\partial a}\right| |\Delta a| + \left|\frac{\partial f}{\partial b}\right| + \left|\frac{\partial f}{\partial c}\right| |\Delta c| =$$

$$= \left|\frac{1}{x}\right| |\Delta a| + \left|\frac{1}{x}\right| |\Delta b| + |1| \, |\Delta c| \leq$$

$$\leq \left|\frac{a}{x}\right| \left|\frac{\Delta a}{a}\right| + \left|\frac{b}{x}\right| \left|\frac{\Delta b}{b}\right| + |c| \left|\frac{\Delta c}{c}\right| \leq$$

$$\leq \mu\left(\left|\frac{a}{x}\right| + \left|\frac{b}{x}\right| + |c|\right) =$$

$$= \mu\left(\underbrace{\left|\frac{e^x}{x}\right|}_{\to 1, x \to 0} + \underbrace{\left|\frac{e^x - 1}{x}\right|}_{\to 1, x \to 0} + \underbrace{\left|\frac{e^x - 1}{x}\right|}_{\to 1, x \to 0}\right) =$$

$$= \mu\left(\left|\frac{1}{x}\right| + ? \right) \approx \frac{\mu}{|x|} \quad (R_x)$$

3.5 $f(x) = \dfrac{a^x - 1}{\ln e^x} = \dfrac{a-1}{\ln a} = \dfrac{b}{\ln a} = \dfrac{b}{c} = d$

6?

$$\left|\frac{\Delta a}{a}\right|, \left|\frac{\Delta b}{b}\right|, \left|\frac{\Delta c}{c}\right|, \left|\frac{\Delta d}{d}\right| \leq \mu$$

$$|\Delta f| \lessapprox \left|\frac{\partial f}{\partial a}\right||\Delta a| + \left|\frac{\partial f}{\partial b}\right||\Delta b| + \left|\frac{\partial f}{\partial c}\right||\Delta c| + \left|\frac{\partial f}{\partial d}\right||\Delta d| =$$

$$= \frac{\ln a - (a-1)\frac{1}{a}}{(\ln a)^2} |\Delta a| \quad //$$

$$= \left|\frac{a \ln a - (a-1)}{a(\ln a)^2}\right||\Delta a| + \left|\frac{1}{\ln a}\right||\Delta b| + \left|-\frac{b}{c^2}\right||\Delta c| + |1||\Delta d| \leq$$

$$= // \frac{a(\ln a - 1) + 1}{a(\ln a)^2} = \frac{\ln a - 1}{(\ln a)^2} + \frac{1}{a(\ln a)^2} = \frac{1}{\ln a} - \frac{1}{(\ln a)^2} + \frac{1}{a(\ln a)^2} //$$

$$\left|\frac{a}{\ln a} - \frac{a}{(\ln a)^2} + \frac{1}{(\ln a)^2}\right|\left|\frac{\Delta a}{a}\right| + \left|\frac{b}{\ln a}\right|\left|\frac{\Delta b}{b}\right| + \left|\frac{b}{c}\right|\left|\frac{\Delta c}{c}\right| + |d|\left|\frac{\Delta d}{d}\right| \leq$$

$$\leq \mu\left(\left|\frac{a}{\ln a} - \frac{a}{(\ln a)^2} + \frac{1}{(\ln a)^2}\right| + \left|\frac{b}{\ln a}\right| + \left|\frac{b}{c}\right| + |d|\right)$$

$$= \mu\left(|a|\left|\frac{1}{\ln a} - \frac{1}{(\ln a)^2}\right| + \left|\frac{1}{(\ln a)^2}\right| + \left|\frac{b}{\ln a}\right| + \left|\frac{b}{c}\right| + |d|\right)$$

återkommer