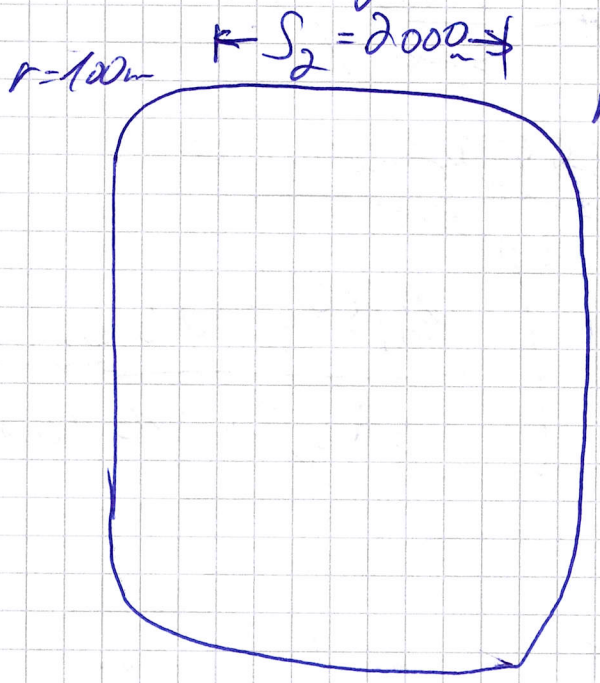
Besprechung № 3

05.05.17



Fahrzeug:

$a(v)_{bestl} = 11,1111 \cdot e^{-0,028v}$

$a(v) = ?$ beim

$\mu = 0,8$ $g = 9,81 \frac{m}{s^2}$

$m = 2000 kg$ $c_w = 0,36$

$\varrho = 1,2 \cdot \frac{kg}{m^3}$

$A = 2,0m \cdot 1,0m$

$a_{Roll} = 1 \frac{km}{h \cdot s} = 0,2778 \frac{m}{s^2}$

$$a(v)_{beim} = -\frac{c_w \cdot A \cdot \varrho}{2 \cdot m} \cdot v^2 + \frac{d - a v_0}{2 \cdot s_{a-c}} + a_{Roll}$$

$$\frac{d-c}{2 \cdot s_{a-c}} = -1g = -9,81 \frac{m}{s^2}$$

$$\Rightarrow a(v)_{beim} = -\frac{81}{312500} v^2 - \frac{50439}{5000}$$

$$a(t) = \frac{dv}{dt} \cdot \frac{ds}{ds} \quad \frac{ds}{dt} \cdot \frac{dv}{ds}$$

$$v \cdot \frac{dv}{ds} \Rightarrow v \cdot \frac{dv}{ds} = f(v) = a$$

$$\hookrightarrow v \cdot \frac{dv}{f(v)} = ds \Rightarrow \int v \frac{dv}{f(v)} = s$$

$$\Rightarrow s = \int_{v_0}^{v_1} \frac{v}{a(v)} \cdot dv$$

$$\Rightarrow s = \int_{v_0}^{v_1} \left(\frac{v}{\frac{-81}{312500} v^2 - \frac{5043}{5000}} \right) dv$$

$$\Rightarrow s = 156250 \ln(54 v_1^2 - 210165)$$

$$\Rightarrow s_{brems}(v_0; v_1) = \frac{156250}{81} \ln\left(\frac{\ln(54 v_1^2 + 210165)}{54 v_0^2 + 210165} \right)$$

$$s = \int_{v_0}^{v_1} \left(\frac{v}{a_{brems}(v)} \right) dv$$

v_0 = v beim Start des Bremsvorgangs

v_1 = v Ende Bremsvorgang

$\Rightarrow$ Abw. um 20% zu real zu lasch.

$\frac{v^2}{100}$

$$s(v_0; v_1) = \int_{v_1}^{v_0} \left(\frac{v}{a(v)} \right) dv$$

Allg:

$$s_{brems}(v_0; v_1) = \frac{1}{a_{Roll} \cdot c_w \cdot m \cdot \rho_L}$$