Vorlesung 12

The law of the wall as derived in the logarithmic form is sometimes not used. Other empirical expressions are used:

Blasius profile

$$\frac{\bar{v}_z(y)}{\bar{v}_{z,max}} = \left(\frac{y}{R}\right)^m$$

oder

$$\frac{\bar{v}_z(y)}{\langle \bar{v}_z \rangle} = \frac{(m+1)(m+2)}{2}\left(\frac{y}{R}\right)^m$$

mit $\frac{1}{10} < m < \frac{1}{6}$

usually $m = 1/7$

With this equation is not possible to predict the shear stress at the wall. It would come out "∞".

This equation is used with the famous Blasius relation to predict the friction factor in pipes:

$$\Delta P = 2 \rho \langle v \rangle^2 f \frac{L}{D}$$

$$f = 0{,}079\ Re^{-1/4}$$

$$\Delta P = \frac{1}{2} \rho \langle v \rangle^2 f \frac{L}{D}$$

$$f = 0{,}316\ Re^{-1/4}$$