CADUTE DI PRESSIONE

CANALE CON AREA VARIABILE - REGIME TRANSITORIO -	$\frac{\partial G_m}{\partial t}+\frac{1}{A_z}\frac{\partial}{\partial z}\left(\frac{G_m^2 A_z}{\rho_m^+}\right)=-\frac{\partial p}{\partial z}-\rho_m g\cos\theta-\frac{1}{A_z}\int_{P_z}\tau_w\,dP_z$ $\left(-\frac{\partial p}{\partial z}\right)=\frac{\partial G_m}{\partial t}+\frac{1}{A_z}\frac{\partial}{\partial z}\left(\frac{G_m^2 A_z}{\rho_m^+}\right)+\frac{1}{A_z}\int_{P_z}\tau_w\,dP_z+\rho_m g\cos\theta$ $\left(-\frac{\partial p}{\partial z}\right)_{tot}=\left(-\frac{\partial p}{\partial z}\right)_{acc.t.}+\left(-\frac{\partial p}{\partial z}\right)_{acc.s.}+\left(-\frac{\partial p}{\partial z}\right)_{fric}+\left(-\frac{\partial p}{\partial z}\right)_{gravity}$	• θ è l'angolo formato tra il versore concorde con la direzione del flusso ed il versore verticale orientato verso l'alto. • $\left(-\frac{\partial p}{\partial z}\right)_{acc.t.}\equiv\left(\frac{\partial G_m}{\partial t}\right);\left(-\frac{\partial p}{\partial z}\right)_{acc.s.}=\frac{1}{A_z}\frac{\partial}{\partial z}\left(\frac{G_m^2 A_z}{\rho^+}\right)$ • $\left(-\frac{\partial p}{\partial z}\right)_{fric}=\frac{1}{A_z}\int_{P_z}\tau_w\,dP_z$; $\left(-\frac{\partial p}{\partial z}\right)_{gravity}=\rho_m g\cos\theta$
CANALE CON AREA COSTANTE - REGIME STAZIONARIO -	$\left(-\frac{\partial p}{\partial z}\right)=\frac{\partial G_m}{\partial t}+\frac{\partial}{\partial z}\left(\frac{G_m^2}{\rho_m^+}\right)+\frac{1}{A_z}\int_{P_z}\tau_w\,dP_z+\rho_m g\cos\theta$ $\left(-\frac{dp}{dz}\right)_{tot}=\left(-\frac{dp}{dz}\right)_{acc}+\left(-\frac{dp}{dz}\right)_{fric}+\left(-\frac{dp}{dz}\right)_{gravity}$	• $\left(-\frac{dp}{dz}\right)_{acc}\equiv G_m^2\frac{d}{dz}\left(\frac{1}{\rho_m^+}\right);\left(-\frac{dp}{dz}\right)_{gravity}\equiv\rho_m g\cos\theta$ • $\left(-\frac{dp}{dz}\right)_{fric}\equiv\frac{1}{A_z}\int_{P_z}\tau_w\,dP_z=\left(\frac{G_m^2}{2\rho_m^+}\right)\frac{f_{TP}}{D_H}=$ $=\left(-\frac{dp}{dz}\right)_{fric}^{lo}\Phi_{lo}^2=\left(\frac{G_m^2}{2\rho_l}\right)\frac{f_{lo}}{D_H}\Phi_{lo}^2$ • $D_H\equiv\frac{4A_z}{P_w}$; $\Phi_{lo}^2\equiv\frac{\rho_l}{\rho_m^+}\frac{f_{TP}}{f_{lo}}$
CANALE CON AREA COSTANTE - REGIME STAZIONARIO - (MODELLO HEM)	$\left(-\frac{dp}{dz}\right)_{tot}=\frac{G_m^2 v_{fg}\frac{dx}{dz}+\left(\frac{G_m^2}{2\rho_m}\right)\frac{f_{TP}}{D_H}+\rho_m g\cos\theta}{\left(1+G_m^2 x\frac{\partial v_g}{\partial p}\right)}\cong$ $G_m^2 v_{fg}\frac{dx}{dz}+\left(\frac{G_m^2}{2\rho_m}\right)\frac{f_{TP}}{D_H}+\rho_m g\cos\theta$	• $\Phi_{lo}^2=\left[1+x\left(\frac{\rho_f}{\rho_g}-1\right)\right]$; nell'ipotesi di $f_{TP}=f_{lo}$ • $\Phi_{lo}^2=\left[1+x\left(\frac{\rho_f}{\rho_g}-1\right)\right]\left[1+x\left(\frac{\mu_f}{\mu_g}-1\right)\right]^{-0.25}$; nell'ipotesi di flusso turbolento e di $f_{TP}=\left(\mu_{TP}/\mu_f\right)^{0.25}f_{lo}$
CANALE CON AREA COSTANTE - REGIME STAZIONARIO -	$(-\Delta p)_{tot}=(-\Delta p)_{acc}+(-\Delta p)_{fric}+(-\Delta p)_{gravity}$	• $(-\Delta p)_{acc}=G_m^2\left[\left(\frac{1}{\rho_m^+}\right)_{out}-\left(\frac{1}{\rho_m^+}\right)_{in}\right]$ • $(-\Delta p)_{fric}=\left(\frac{G_m^2}{2\rho_l}\right)\left(\frac{f_{lo}}{D}\right)\int_{z_{in}}^{z_{out}}\Phi_{lo}^2\,dz$ • $(-\Delta p)_{gravity}=\int_{z_{in}}^{z_{out}}\rho_m g\cos\theta$
CANALI CORTI CON BRUSCHI CAMBIAMENTI DI AREA - REGIME STAZIONARIO -	$(-\Delta p)_{tot}=(-\Delta p)_{acc}+(-\Delta p)_{form}$	• $(-\Delta p)_{acc}\cong\left[\left(G_m^2\right)_{out}-\left(G_m^2\right)_{in}\right]/(2\rho_m)$ • $(-\Delta p)_{form}\cong K_C\left(\frac{G_m^2}{2\rho_m}\right)_{out}$; $(-\Delta p)_{form}\cong K_E\left(\frac{G_m^2}{2\rho_m}\right)_{in}$