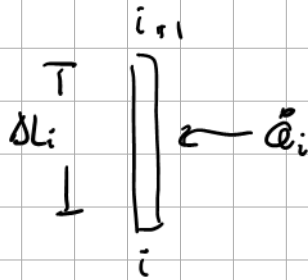


Lecture 42: Temperature calculations in wellbore - exercise

BO table column	
TVD [m]	T [C]
0	50.0
500	57.1
1000	64.3
1500	71.4
2000	78.6
2500	85.7
3000	92.9
3500	100.0



$$h_{i+1} = \frac{\dot{Q}_i}{\dot{m}} + h_i - \Delta z \cdot g$$

$$\left. \frac{d\dot{Q}}{dz} \right|_i = -2\pi r \cdot U_i (T_{fi} - T_{faw,i})$$



$$\dot{Q}_i = \left(\left. \frac{d\dot{Q}}{dz} \right|_i + \left. \frac{d\dot{Q}}{dz} \right|_{i+1} \right) \frac{1}{2} \cdot \Delta L_i$$

trapezoidal rule !

residual $\mathcal{E} = 0 = \frac{\dot{Q}_i}{\dot{m}} + h_i - h_{i+1} - \Delta z \cdot g$

BO table column	
TVD [m]	T [C]
0	50.0
500	57.1
1000	64.3
1500	71.4
2000	78.6
2500	85.7
3000	92.9
3500	100.0

TVD [m]	T [C]	p[bara]
0	65.6	28
500	74.5	44.8
1000	81.2	65.3
1500	86.3	89.1
2000	90.9	115.8
2500	94.9	144.5
3000	97.9	174.7
3500	100.0	205.9