

+ Exact solution

3 equations

$$V_2 + 2 * \sqrt{g * d_2} = 2 * \sqrt{g * d_0}$$

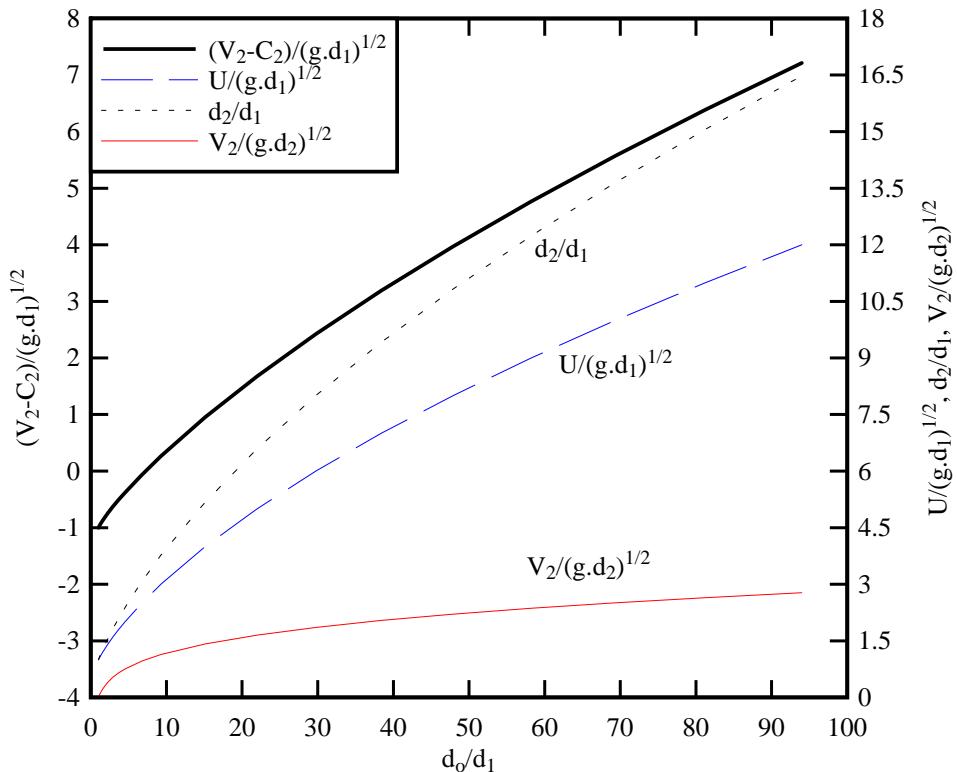
[C] & [M]

Forward characteristics
at positive surge front

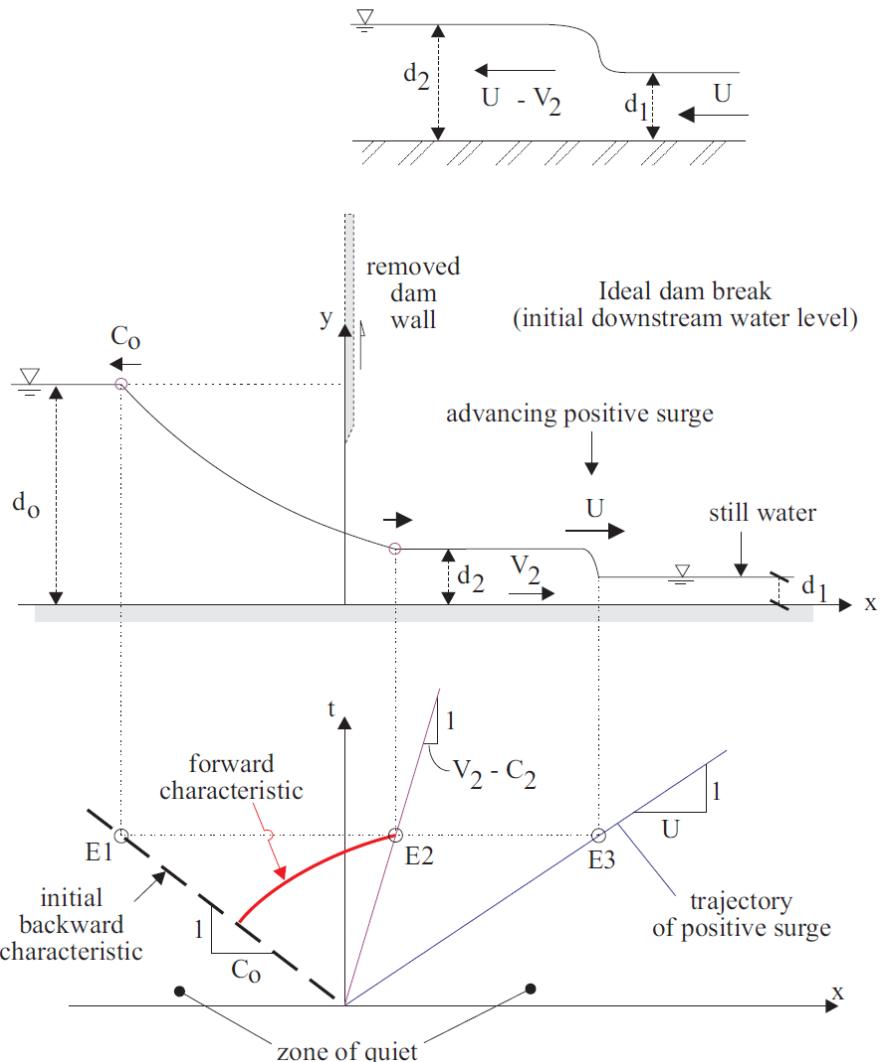
3 unknowns

V_2 , d_2 and U

+ Graphical solution



Quasi-steady flow analogy at the surge front
(as seen by an observer travelling at the surge velocity)



- Locations of points E2 and E3

$$x_{E2} = (V_2 - C_2) * t$$

$$x_{E3} = U * t$$

Note : $U > (V_2 - C_2)$ for $t > 0$ & $0 < d_1/d_0 < 1$

- Surge celerity

$$\sqrt{\frac{d_0}{d_1}} = \frac{1}{2} * \frac{U}{\sqrt{g * d_1}} * \left(1 - \frac{1}{X} \right) + \sqrt{X}$$

where $X = \frac{1}{2} * \left(\sqrt{1 + 8 * \frac{U^2}{g * d_1}} - 1 \right)$