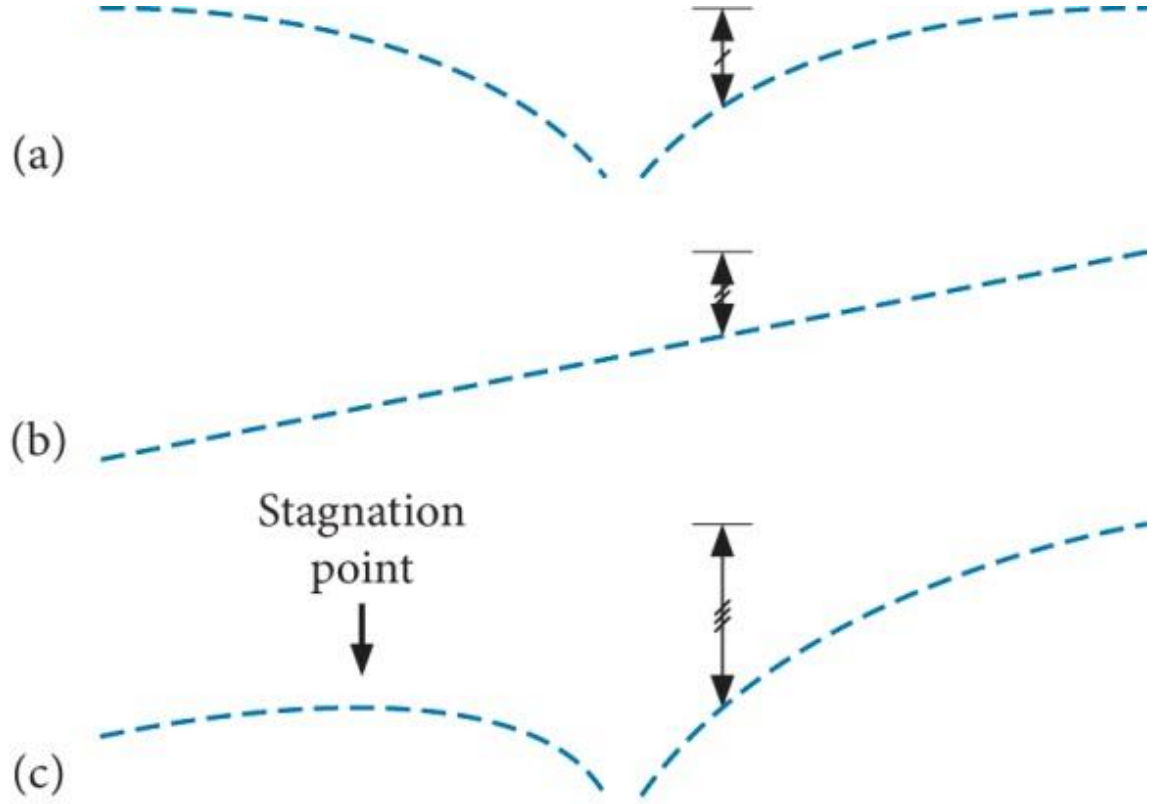
A well in a regional groundwater flow field

https://www.youtube.com/user/MartinRHendriks/videos

$$h_r = h_R + \frac{Q_0}{2\pi T} \ln \frac{r}{R}$$

$$h_x = ix + C = ir + C$$



$$h_{tot} = h_r + h_x = h_R + \frac{Q_0}{2\pi T} \ln \frac{r}{R} + ir + C = h_R + \frac{Q_0}{2\pi T} (\ln r) - \frac{Q_0}{2\pi T} (\ln R) + ir + C$$

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$$h_r = h_R + \frac{Q_0}{2\pi T}\ln\frac{r}{R}$$

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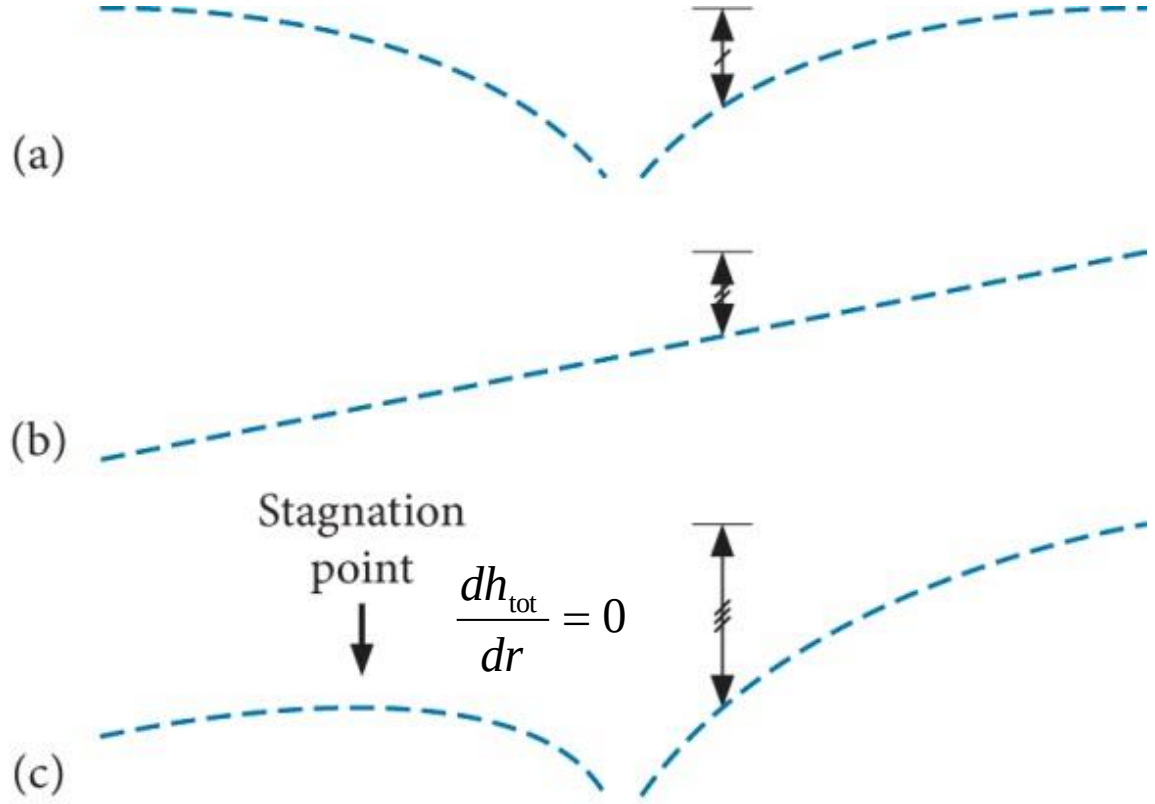

$$h_{tot} = h_r + h_x = h_R + \frac{Q_0}{2\pi T}\ln\frac{r}{R} + ir + C = h_R + \frac{Q_0}{2\pi T}(\ln r) - \frac{Q_0}{2\pi T}(\ln R) + ir + C$$

$$\frac{Q_0}{2\pi T}\left(\frac{1}{r}\right) + i = 0 \Rightarrow \frac{Q_0}{2\pi T r} + i = 0 \Rightarrow \frac{Q_0}{2\pi T r} = -i \Rightarrow 2\pi T r = \frac{-Q_0}{i} \Rightarrow r = \frac{-Q_0}{2\pi T i}$$

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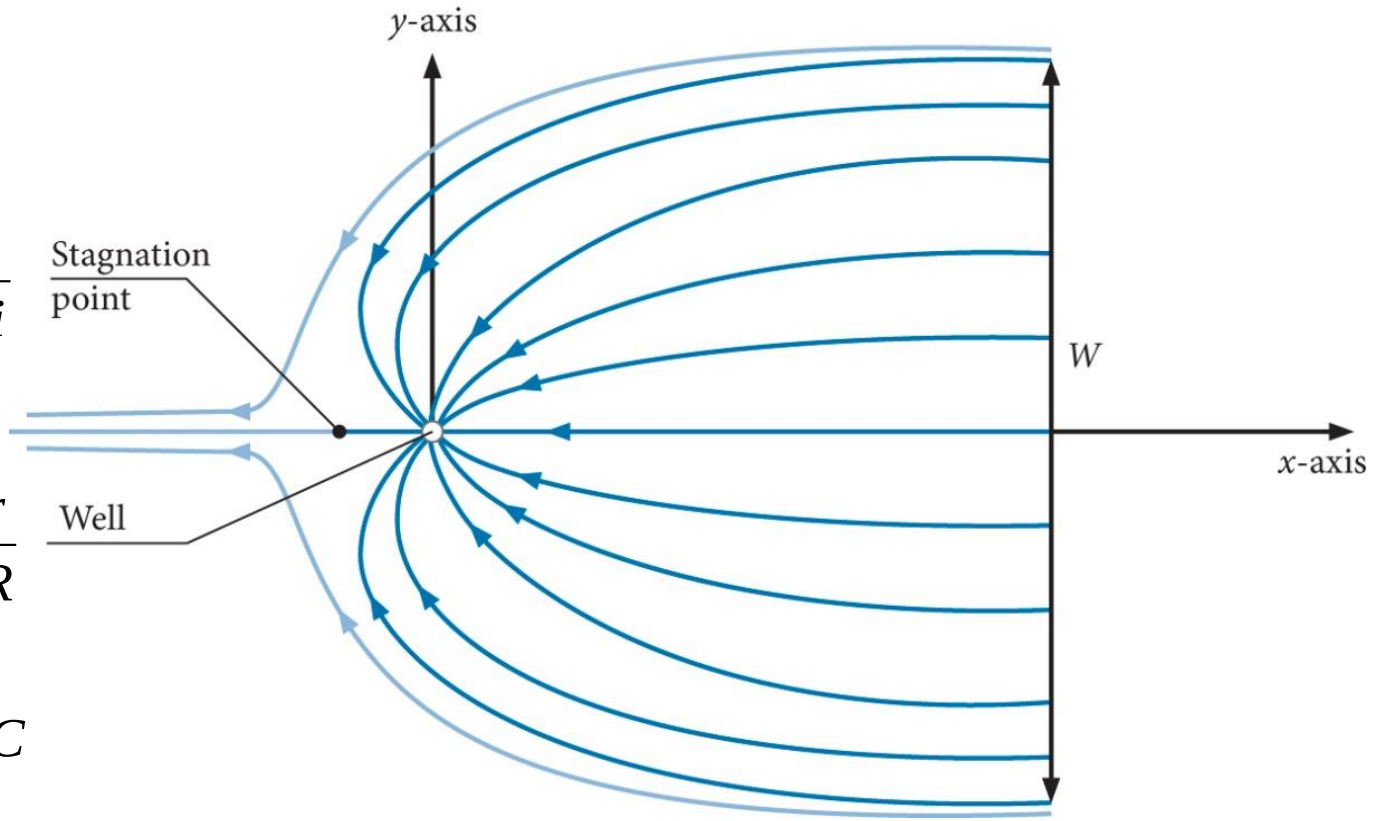
$$\frac{dh_{tot}}{dr} = 0 \quad r = \frac{-Q_0}{2\pi T i}$$

$$h_r = h_R + \frac{Q_0}{2\pi T} \ln \frac{r}{R}$$

$$h_x = ix + C = ir + C$$



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