Hydraulic Testing – Assignment

Name: **ID:**

Task: Evaluate the Oude Korendijk pumping test data with a different pumping rate

Open the link:
`https://mybinder.org/v2/gh/eholzbe/Hydraulic-testing/5df02fa44c6cfcb7926075247dc6958395dcefcd?filepath=Hydraulic%20Testing.ipynb`

Pumping rate: the last three digits of your ID
Pumping rate: m^3/d

1. Evaluation of Steady State Data

1.1. Calculate transmissivities using drawdowns measured in different pairs of observation points. Use unit m^2/d. Fill in the white cells of the following table:

Observation points	H30	H90	H215
H08			
H30			
H90			

1.2.1 Calculate conductivities for the confined aquifer using drawdowns measured in different pairs of observation points. Use unit m/d. Fill in the white cells of the following table for a thickness of 7 m:

Observation points	H30	H90	H215
H08			
H30			
H90			

1.2.2 Calculate conductivities for the confined aquifer using drawdowns measured in different pairs of observation points. Use unit m/d. Fill in the white cells of the following table for a thickness of 10 m:

Observation points	H30	H90	H215
H08			
H30			
H90			

1.3.1 Calculate conductivities for the unconfined aquifer using drawdowns measured in different pairs of observation points. Use unit m/d. Fill in the white cells of the following table for an initial head of 7 m:

Observation points	**H30**	**H90**	**H215**
H08			
H30			
H90			

1.3.2 Calculate conductivities for the unconfined aquifer using drawdowns measured in different pairs of observation points. Use unit m/d. Fill in the white cells of the following table for initial head of 10 m:

Observation points	**H30**	**H90**	**H215**
H08			
H30			
H90			

1.4.1 Estimate hydraulic conductivities for the confined aquifer using curve fitting using all four observations. Note the results for different initial heads!

Initial head [m]	7	10
Hydraulic conductivity [m/d]		

1.4.2 Estimate hydraulic conductivities for the unconfined aquifer using curve fitting using all four observations. Note the results for different initial heads!

Initial head [m]	7	10
Hydraulic conductivity [m/d]		

1.4.3 Calculate the transmissivity and resistance for the leaky aquifer using drawdowns measured at all observation points. Based on the results calculate the hydraulic conductivities, assuming aquifer thicknesses of 7 and 10 m:

Aquifer thickness [m]	7	10
Hydraulic conductivity [m/d]		

2. Evaluation according to Theis

2.1 Calculate transmissivity and storativity from data measured at observation points H30 and H90 using the Cooper-Jacob method in the semilog plot with *x*-axis t/r^2.

Observation point	**H30**	**H90**
Transmissivity [m^2/d]		
Storativity		

2.2 Use the graphical tools for type curve matching, multi-graph or single graph, finding transmissivity and storativity based on observations H30 and H90:

Observation point	**H30**	**H90**
Slider A		
Slider log10(B)		
Transmissivity [m^2/d]		
Storativity		
2-norm		
Standard deviation		

2.3 Use parameter estimation for the task 2.2

Observation point	**H30**	**H90**
Initial transmissivity		
Initial storativity		
Transmissivity [m^2/d]		
Storativity		
2-norm		
Number of iterations		
Standard deviation		

2.4 Calculate conductivities

Based on the results in 2.3 calculate the hydraulic conductivities, assuming aquifer thicknesses of 7 and 10 m:

Aquifer thickness [m]		7	10
Hydraulic conductivity [m/d]	*H30*		
	H90		

3. Evaluation according to Hantush

3.1 Use parameter estimation to calculate transmissivity, storativity and conductance based on observations in H30 and H90

Observation point	**H30**	**H90**
Initial transmissivity		
Initial storativity		
Initial resistance		
Transmissivity [m^2/d]		
Storativity		
Resistance		
2-norm		
Number of iterations		
Standard deviation		

3.2 Calculate conductivities

Based on the results in 3.1 calculate the hydraulic conductivities, assuming aquifer thicknesses of 7 and 10 m:

Aquifer thickness [m]		7	10
Hydraulic conductivity [m/d]	*H30*		
	H90		

4. Results Comparison

Compare results from tasks 1-3, and discuss differences!
Fill in the following tables with what in your opinion are the best results!

Aquifer Type	**Transmissivity (m^2/d)**			**Storativity**		**Resistance [d]**		
	Thiem de Glee	Theis Hantush		Theis Hantush [10^{-4}]		de Glee	Hantush	
Obs. wells		*P30*	*P90*	*P30*	*P90*		*P30*	*P90*
Confined								
Leaky								

What values of transmissivity and storativity would you recommend in a report on the pumping test?

Aquifer Type	**Hydraulic Conductivity [m/d]**					
Thickness or Initial head [m]	7			10		
	Thiem de Glee	Theis Hantush		Thiem de Glee	Theis Hantush	
Obs. wells		*P30*	*P90*		*P30*	*P90*
Confined						
Leaky						
Unconfined						

What value of hydraulic conductivity would you recommend in a report?
Is the aquifer confined, unconfined or leaky?