Hydraulic Testing – Task Sheet

Name: **ID:**

Task: Evaluate the Oude Korendijk pumping test

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

Pumping rate unit: 788 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 [m²/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 (m²/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?