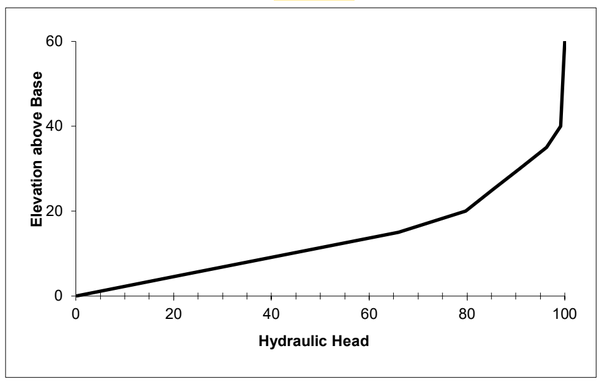
Direct solution for flux

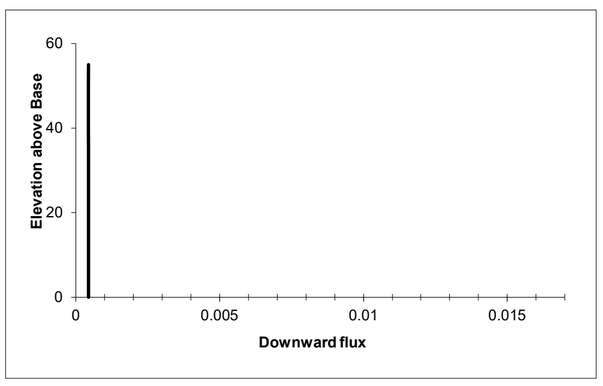
	K	num cells
zone 1	0.0004	4
zone 2	0.01	4.5
zone 3	0.0001	3.5
Keq	0.000264	
q	0.00044	

z	K zone cell	K cell	H	q	zone 1	zone 2	zone 3
60	2	0.01	100		0	1	0
55	2	0.01	99.77996	0.00044	0	1	0
50	2	0.01	99.55993	0.00044	0	1	0
45	2	0.01	99.3399	0.00044	0	1	0
40	2	0.01	99.11988	0.00044	0	1	0
35	1	0.0004	96.25958	0.00044	1	0	0
30	1	0.0004	90.759	0.00044	1	0	0
25	1	0.0004	85.25844	0.00044	1	0	0
20	1	0.0004	79.75789	0.00044	1	0	0
15	3	0.0001	66.00653	0.00044	0	0	1
10	3	0.0001	44.00435	0.00044	0	0	1
5	3	0.0001	22.00217	0.00044	0	0	1
0	3	0.0001	0	0.00044	0	0	1

Map of node and cell numbers

	node	cell	
1	-		1
2	-		2
3	-		3
4	-		4
5	-		5
6	-		6
7	-		7
8	-		8
9	-		9
10	-		10
11	-		11
12	-		12
13	-		13





The Challenge:

Create a 1D, vertical steady state model with constant head top and bottom boundaries.

Show, based on the flux with depth, that the model is steady state.
Repeat this for a homogeneous and for a heterogeneous column.

Show that the steady state flux agrees with the direct calculation based on the harmonic mean average K.

Show the steady state head profile for a column with approximately equal-thickness layers with different K values.
Use this profile to explain why the equivalent hydraulic conductivity, Keq, is closer to the lower of the K values.

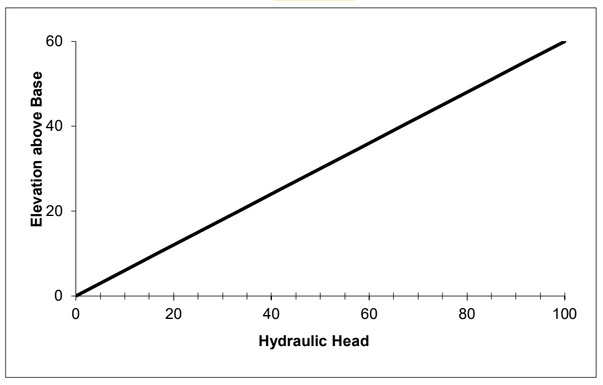
Direct solution for flux

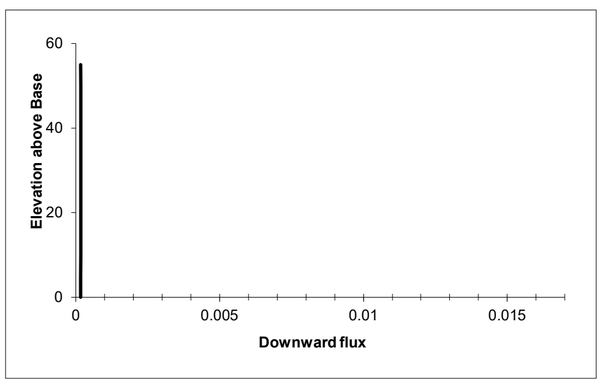
	K	num cells
zone 1	0.0004	0
zone 2	0.01	0
zone 3	0.0001	12
Keq	0.0001	
q	0.000167	

z	K zone cell	K cell	H	q	zone 1	zone 2	zone 3
60	3	0.0001	100		0	0	1
55	3	0.0001	91.66361	0.000167	0	0	1
50	3	0.0001	83.32763	0.000167	0	0	1
45	3	0.0001	74.9922	0.000167	0	0	1
40	3	0.0001	66.65744	0.000167	0	0	1
35	3	0.0001	58.3234	0.000167	0	0	1
30	3	0.0001	49.99006	0.000167	0	0	1
25	3	0.0001	41.65739	0.000167	0	0	1
20	3	0.0001	33.3253	0.000167	0	0	1
15	3	0.0001	24.99367	0.000167	0	0	1
10	3	0.0001	16.66234	0.000167	0	0	1
5	3	0.0001	8.331171	0.000167	0	0	1
0	3	0.0001	0	0.000167	0	0	1

Map of node and cell numbers

	node	cell	
1	-		1
2	-		2
3	-		3
4	-		4
5	-		5
6	-		6
7	-		7
8	-		8
9	-		9
10	-		10
11	-		11
12	-		12
13	-		13





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