**Supplemental Materials**

**Determination of Double-Porosity Fractured Aquifers Hydraulic Parameters by a Simple Artificial Neural Network**

*f(x)*

*x*

f(x) = tansig(x)

0

-1

+1

*f(x)*

*x*

f(x) = purelin(x)

0

-1

+1

**Fig. S1** Activation functions

**Table S1.** Time-drawdown data in the first pumping test (Moench, 1984)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Time (min) | Drawdown (m) | Time (min) | Drawdown (m) | Time (min) | Drawdown (m) | Time (min) | Drawdown (m) |
| 0.5 | 0.002 | 4 | 0.045 | 40 | 0.374 | 600 | 0.518 |
| 0.6 | 0.002 | 4.5 | 0.052 | 45 | 0.384 | 700 | 0.525 |
| 0.7 | 0.002 | 5 | 0.059 | 50 | 0.392 | 800 | 0.528 |
| 0.8 | 0.002 | 5.5 | 0.069 | 60 | 0.401 | 900 | 0.528 |
| 0.9 | 0.002 | 6 | 0.079 | 70 | 0.411 | 1000 | 0.538 |
| 1 | 0.005 | 7 | 0.097 | 120 | 0.434 | 1200 | 0.563 |
| 1.2 | 0.005 | 8 | 0.116 | 140 | 0.439 | 1400 | 0.577 |
| 1.4 | 0.007 | 9 | 0.134 | 160 | 0.444 | 1600 | 0.577 |
| 1.6 | 0.007 | 10 | 0.151 | 180 | 0.451 | 1800 | 0.577 |
| 1.8 | 0.012 | 12 | 0.186 | 200 | 0.453 | 2000 | 0.59 |
| 2 | 0.015 | 14 | 0.213 | 240 | 0.461 | 2300 | 0.587 |
| 2.2 | 0.015 | 16 | 0.238 | 280 | 0.468 | 2700 | 0.615 |
| 2.4 | 0.02 | 18 | 0.26 | 300 | 0.471 | 3000 | 0.615 |
| 2.6 | 0.022 | 20 | 0.285 | 340 | 0.478 | 3500 | 0.627 |
| 2.8 | 0.025 | 25 | 0.32 | 400 | 0.491 | 3680 | 0.639 |
| 3 | 0.027 | 30 | 0.342 | 440 | 0.498 |  |  |
| 3.5 | 0.037 | 35 | 0.359 | 500 | 0.506 |  |  |

**Table S2.** Time-drawdown data in the second pumping test (McConnell, 1993)

|  |  |  |  |
| --- | --- | --- | --- |
| Time (min) | Drawdown (ft) | Time (min) | Drawdown (ft) |
| 1 | 30 | 120 | 129 |
| 2 | 49 | 150 | 130 |
| 3 | 62 | 180 | 133 |
| 4 | 70 | 210 | 136 |
| 5 | 75 | 240 | 140 |
| 6 | 80 | 300 | 143 |
| 7 | 83 | 360 | 145 |
| 8 | 85 | 420 | 149 |
| 9 | 89 | 480 | 151 |
| 10 | 90 | 540 | 151 |
| 12 | 91 | 600 | 153 |
| 14 | 93 | 660 | 155 |
| 16 | 96 | 720 | 158 |
| 18 | 99 | 780 | 160 |
| 20 | 100 | 840 | 160 |
| 25 | 103 | 900 | 160 |
| 30 | 104 | 960 | 160 |
| 35 | 108 | 1020 | 160 |
| 40 | 110 | 1080 | 161 |
| 45 | 111 | 1140 | 161 |
| 50 | 114 | 1200 | 162 |
| 55 | 117 | 1260 | 164 |
| 60 | 118 | 1320 | 165 |
| 70 | 120 | 1380 | 169 |
| 80 | 122 | 1440 | 171 |
| 90 | 123 | 1500 | 173 |
| 100 | 124 | 1530 | 174 |
| 110 | 127 |  |  |