Exponential function essay sample

An example of an exponential function is the voltage as a function of time

Vf(t) as the capacitor C1 discharges from an initial voltage Vi to a resistive

load R1. The circuit of this is shown below

Figure 1. Discharge of Capacitor

Where

Vf is the final voltage

Vi is the initial voltage across the C1

Time	Calculated Value	Oscilloscope Reading
0. 05	7. 278	7. 300
0. 10	4. 415	4. 500
0. 15	2. 678	2. 700
0. 20	1. 624	1. 700
0. 25	0. 985	1. 000
0. 30	0. 597	0. 700
0. 35	0. 362	0. 400
0. 40	0. 220	0. 200
0. 45	0. 133	0. 100

0. 50   0. 081   0. 000

Table 1. Calculated and Oscilloscope Voltages

Figure 2. Calculated Voltages

Figure 3. Oscilloscope Voltages

Logarithmic Function

An example of an logarithmic function is the Sound Pressure Level which is expressed in decibels.

SPL = 20 log(P/P0)   (dangerousdecibels. org, 2005)

Where:

SPL   is the sound pressure level in decibels

P0   is the reference threshold of hearing, 2×10^{-5} N/m^2

P   is the measured pressure amplitude in N/m^2

SPL

P

Calculate Measure

d   d

0. 00001	-6. 021	-6. 000
0. 00005	7. 959	8. 000
0. 0001	13. 979	14. 000
0. 0005	27. 959	28. 000
0. 001	33. 979	34. 000
0. 005	47. 959	48. 000
0. 01	53. 979	54. 000
0. 05	67. 959	68. 000
0. 1	73. 979	74. 000
0. 5	87. 959	88. 000
1	93. 979	94. 000
5	107. 959	108. 000
10	113. 979	114. 000
50	127. 959	128. 000

100   133. 979 134. 000

Table 2. Calculated and Measured Sound Pressure Levels

Figure 5. Calculated Sound Pressure Levels

Figure 6. Measured Sound Pressure Levels

Appendix

Spreadsheet for Exponential Function

Spreadsheet for Logarithmic Function

References

” Sound Measures”. DangerousDecibels. org website: http:// www. dangerousdecibels. org/teachers_guide/DDB_TRG_Activities_10. pdf on May 1, 2007