

TABLE 17 Neurons, Weights and Biases for the First Hidden Layer for the Reduced (Refractive Index & Sound Velocity) ANN Model

| Neuron | Temperature | Molecular weight | Number of C | Number of H | Number of N | Number of O | Density | Viscosity | Bias |
|--------|-------------|------------------|-------------|-------------|-------------|-------------|---------|-----------|---------|
| 1 | -0.1124 | 0.6348 | -0.1873 | 0.4645 | 0.1034 | 0.2243 | 0.0002 | -0.1052 | -0.1158 |
| 2 | 0.0615 | -0.3450 | -0.8294 | -0.1796 | -0.4868 | -0.2349 | 0.0533 | -0.3133 | 0.1328 |
| 3 | 0.5461 | -0.0927 | 0.6757 | 0.2881 | -0.6074 | 0.4297 | -0.4679 | -0.5559 | 0.1199 |
| 4 | 0.0927 | 0.5841 | -0.1074 | 0.5233 | -0.4246 | -0.4336 | -0.4754 | 0.5572 | -0.1090 |
| 5 | 0.1490 | -0.5444 | 0.6037 | 0.4292 | 0.4622 | -0.4950 | -0.2201 | -1.0798 | 0.3012 |
| 6 | 0.5757 | 0.2660 | -0.5993 | 0.0854 | -0.4168 | 0.5109 | -0.3404 | 0.8664 | 0.2324 |
| 7 | 0.5141 | 0.5379 | 0.4001 | 0.5429 | -0.2441 | 0.4389 | -0.5126 | 0.3049 | 0.1068 |
| 8 | 0.0563 | 0.2174 | 0.4328 | 0.5608 | 0.5297 | -0.1892 | -0.3629 | 0.4120 | 0.2365 |
| 9 | 0.4652 | -0.3000 | 0.1158 | 0.7321 | 0.3856 | -0.8809 | 0.3438 | 0.4824 | -0.0531 |
| 10 | 0.7418 | 0.3283 | -0.6438 | 0.7119 | 0.4064 | -0.8005 | -0.1244 | -0.3977 | 0.1852 |
| 11 | 0.2276 | 0.8759 | 0.6164 | 0.8747 | 0.0400 | 0.3592 | -0.8716 | 0.6410 | -0.2100 |
| 12 | 0.1087 | -0.7280 | 0.2788 | 0.0503 | -1.2021 | -0.0328 | 0.3785 | -0.0224 | 0.3546 |
| 13 | -0.5202 | 0.6770 | -0.0261 | -0.6915 | 0.8760 | -0.9841 | 0.0394 | 0.6508 | 0.1744 |
| 14 | 0.0531 | 0.8788 | 0.9902 | -0.0819 | -0.3536 | -0.1227 | -0.2712 | 0.7150 | 0.1844 |
| 15 | 0.2421 | 0.8376 | -0.6455 | 0.9184 | 0.6953 | 0.4072 | -0.2738 | 0.8454 | -0.1895 |
| 16 | 0.0890 | 0.4068 | 0.0635 | 0.5081 | 0.5596 | -0.4588 | -0.4789 | -0.8583 | 0.2146 |
| 17 | 0.2639 | -0.3405 | -0.6563 | -0.5088 | 0.1728 | 0.3697 | -0.4624 | -0.4943 | 0.1529 |
| 18 | 0.7855 | -0.3594 | 0.5913 | 0.1127 | 0.3087 | 0.1566 | 0.6119 | -0.3837 | 0.1080 |
| 19 | 0.1410 | -0.0114 | 0.7488 | -0.7060 | -0.6965 | 0.3823 | 0.6775 | -0.2402 | 0.2199 |
| 20 | 0.3099 | -0.6274 | -0.3260 | -0.1632 | -0.4577 | -0.4790 | -0.7153 | 0.0169 | 0.3601 |
| 21 | 0.4944 | 0.0026 | 0.5356 | -0.0617 | -0.0308 | 0.5477 | -0.6159 | -0.7886 | 0.3109 |
| 22 | 0.7639 | -0.1264 | 0.2089 | 0.9107 | -0.5838 | -0.7296 | 0.6672 | -0.2214 | -0.2152 |

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| 23 | 0.1166 | 0.1045 | 0.3700 | -0.9411 | 0.8753 | 0.2054 | 0.3032 | 0.1617 | -0.0329 |
| 24 | 0.0609 | -0.1350 | -0.1921 | 0.3794 | -0.8310 | 0.6281 | 0.6988 | -0.6927 | 0.2667 |
| 25 | -0.6552 | 0.7355 | -0.4250 | 0.3771 | 0.2129 | -0.3710 | -0.0342 | -0.6665 | 0.3866 |
| 26 | 0.6890 | -0.5657 | 0.6196 | -0.2864 | -0.3520 | -0.2700 | 0.5165 | 0.5083 | -0.1347 |
| 27 | -0.6732 | 0.2030 | 0.5096 | -0.1973 | -0.9718 | -0.6391 | 0.6424 | -0.6936 | 0.2777 |
| 28 | 0.2173 | 0.5484 | -0.3094 | 0.0621 | 0.1741 | -0.6550 | 0.2073 | 0.4688 | -0.0303 |
| 29 | -0.6974 | 0.4656 | 0.1492 | -0.3026 | 0.7717 | 0.9050 | -0.7429 | -0.6089 | 0.1536 |
| 30 | 0.1526 | -0.4806 | -0.6957 | 0.8162 | -0.7643 | 0.4780 | 0.2927 | 0.7566 | 0.1915 |
| 31 | 0.0945 | -0.5134 | -0.2309 | 0.7205 | 0.9501 | -0.5224 | -0.5596 | 0.6869 | 0.0859 |
| 32 | 0.2465 | -0.2837 | -0.2653 | 0.6383 | -0.7153 | -0.4952 | -0.4650 | -0.5650 | 0.5163 |
| 33 | 0.0365 | -0.7152 | 0.6098 | 0.8256 | -0.3674 | -0.8255 | -0.1359 | 0.8580 | -0.2322 |
| 34 | 0.5208 | 0.2592 | -0.8057 | 0.1775 | 0.1458 | 0.3018 | -0.5660 | 0.3805 | -0.3196 |
| 35 | -0.2938 | -0.7255 | 0.7986 | 0.3319 | -0.0357 | 0.0326 | 0.2618 | 0.4753 | 0.2338 |
| 36 | 0.0461 | -0.5900 | 0.9098 | -0.7344 | -0.6309 | 0.5015 | -0.2017 | 0.5709 | 0.3059 |
| 37 | 0.1191 | 0.5190 | 0.5997 | -0.7229 | -0.3856 | 0.8398 | -0.3775 | -0.2760 | 0.2416 |
| 38 | 0.9021 | 0.4589 | -0.7767 | 0.2780 | -0.1635 | 0.1610 | -0.3135 | 0.6061 | -0.2489 |
| 39 | -0.2666 | -0.0804 | 0.1347 | 0.1864 | -0.7957 | 0.4831 | -0.7491 | -0.6082 | 0.6132 |
| 40 | 0.2850 | 0.7118 | -0.7793 | -0.2098 | -0.5247 | 0.3116 | -0.1219 | 0.4998 | -0.1063 |