

# Appendix (A)

## A.1. Definition of PNN Tab Options

The PNN tab in VariReg software shown in Figure (A-1), all options which can be used are defined below:

1. (Maximal) degree of polynomials in each neuron.
2. Algorithms using in polynomial neural network
3. Error criteria
4. whether the inputs to the neurons are taken only from the preceding layer or also from the original input variables
5. Maximum number of inputs in each neuron.
6. Maximum number of neurons in each layer
7. Draw surface of the model right after building it.
8. Save the results in notepad file
9. Information and evaluation of the build model

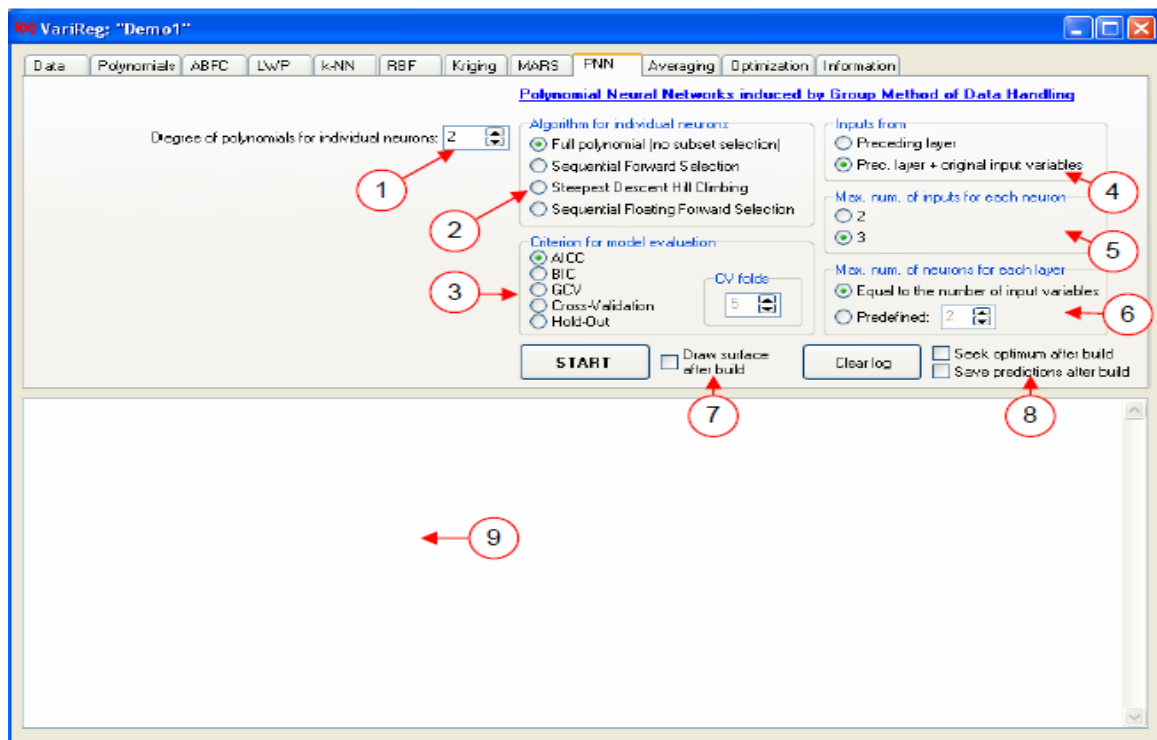


Figure A-1: Definition of PNN Tab Options

The template file (notepad file) for loading data of training and testing datasets are shown in Figure(A-2) and Figure (A-3) respectively.

```

training
5 151
pb_meas
T_F
Rs
API
gas
4155 228.7 877.7 40.1 0.8425
3812 210.3 770.0 39.7 1.0145
3812 210.3 770.2 39.8 1.0145
3179 210.0 641.0 38.2 0.8230
3812 210.3 770.2 37.0 1.0145
56 150.8 6.7 21.9 0.9993
40 192.0 8.0 32.8 0.9635
81 183.6 8.6 21.7 1.3983
120 150.0 24.0 20.9 0.7331
2257 181.6 368.0 33.7 0.8969
88 138.6 7.1 39.0 1.4270
2364 179.3 333.0 29.6 0.6550
97 107.6 5.6 20.2 0.8780
31 107.6 4.3 27.2 0.6170
1500 165.0 170.0 26.0 0.6870
  
```

**Figure A-2:** Notepad file for entering training data, an example from this study

```

validation and testing.txt
51
1502 176.0 220.9 30.3 0.6181
1506 160.9 187.4 34.1 0.6904
1456 204.4 438.8 42.7 1.0362
309 198.0 69.7 40.8 1.4260
106 194.4 8.5 23.3 0.8380
108 192.9 8.2 21.3 0.9090
215 187.0 34.7 23.7 1.1540
263 199.0 54.7 43.6 1.4630
200 178.0 15.9 21.0 0.7460
422 142.5 42.6 24.0 0.9120
190 202.5 11.2 21.6 0.8620
96 161.0 8.7 23.8 0.8870
383 195.6 34.5 22.5 0.8790
1332 231.8 312.7 38.8 1.0420
97 152.6 4.4 24.0 0.6580
96 152.6 4.5 23.8 0.8100
400 167.2 54.4 27.9 0.6983
773 167.2 85.6 29.5 0.6727
500 173.3 72.2 30.1 0.7261
480 173.3 62.8 30.6 0.7321
207 156.9 35.6 37.3 1.0452
  
```

**Figure A-3** Notepad file for entering testing data, an example from this study