

Appendix

Parts of Experiment Results

Sample Size = 10

| | x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------------|------------|--------|-------|------|-------|-------|-------|-------|--------|---------|----------|
| Function | f(X) | 1.44 | 2.17 | 3.33 | 8.19 | 17.92 | 29.16 | 36.78 | 39.64 | 43.1 | 54.61 |
| Linear Model | E[f1(x)] | -3.57 | 2.48 | 8.52 | 14.57 | 20.62 | 26.66 | 32.71 | 38.76 | 44.8 | 50.85 |
| Quadratic Model | E[f2(x)] | -3.53 | 1.22 | 6.48 | 12.26 | 18.55 | 25.34 | 32.65 | 40.48 | 48.81 | 57.65 |
| Cubic Model | E[f3(x)] | 0.32 | 0.11 | 3.75 | 10.15 | 18.24 | 26.94 | 35.17 | 41.85 | 45.91 | 46.27 |
| Fourth power Model | E[f4(x)] | 5.76 | 1.48 | 3.41 | 9.69 | 18.42 | 27.72 | 35.71 | 40.51 | 40.24 | 33.01 |
| Fifth power Model | E[f5(x)] | 3.4 | 2.24 | 2.78 | 8.43 | 18.33 | 29.3 | 37.7 | 41.4 | 41.66 | 45.07 |
| Linear Model | Var[f1(x)] | 9.32 | 6.7 | 4.61 | 3.05 | 2.01 | 1.5 | 1.52 | 2.07 | 3.14 | 4.74 |
| Quadratic Model | Var[f2(x)] | 54.49 | 21.05 | 8.05 | 4.78 | 4.47 | 4.37 | 5.67 | 13.57 | 37.21 | 89.73 |
| Cubic Model | Var[f3(x)] | 73.82 | 20.7 | 5.74 | 2.12 | 1.72 | 2.56 | 5.74 | 21.8 | 86.53 | 286.26 |
| Fourth power Model | Var[f4(x)] | 219.86 | 22.66 | 8.49 | 5.25 | 3 | 4.22 | 7.07 | 9.84 | 106.79 | 927.78 |
| Fifth power Model | Var[f5(x)] | 788 | 23.39 | 9.91 | 4.18 | 2.66 | 7.65 | 46.17 | 348.75 | 2684.19 | 17371.14 |

Sample Size = 100

| | x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------------|------------|--------|-------|-------|--------|--------|--------|--------|--------|--------|--------|
| Function | f(X) | 1.44 | 2.168 | 3.33 | 8.185 | 17.918 | 29.161 | 36.777 | 39.636 | 43.1 | 54.609 |
| Linear Model | E[f1(x)] | -2.858 | 3.038 | 8.933 | 14.828 | 20.723 | 26.619 | 32.514 | 38.409 | 44.304 | 50.2 |
| Quadratic Model | E[f2(x)] | -0.646 | 3.262 | 7.741 | 12.79 | 18.411 | 24.602 | 31.365 | 38.698 | 46.602 | 55.077 |
| Cubic Model | E[f3(x)] | 0.025 | 0.692 | 4.549 | 10.729 | 18.361 | 26.576 | 34.504 | 41.276 | 46.022 | 47.872 |
| Fourth power Model | E[f4(x)] | 0.036 | 0.541 | 4.485 | 10.812 | 18.531 | 26.716 | 34.502 | 41.091 | 45.748 | 47.801 |
| Fifth power Model | E[f5(x)] | 2.48 | 1.525 | 2.727 | 8.805 | 18.527 | 28.713 | 36.245 | 40.077 | 43.237 | 54.838 |
| Linear Model | Var[f1(x)] | 0.641 | 0.466 | 0.326 | 0.222 | 0.153 | 0.121 | 0.123 | 0.161 | 0.235 | 0.344 |
| Quadratic Model | Var[f2(x)] | 0.356 | 0.204 | 0.226 | 0.296 | 0.337 | 0.323 | 0.273 | 0.257 | 0.392 | 0.843 |
| Cubic Model | Var[f3(x)] | 0.175 | 0.148 | 0.166 | 0.121 | 0.091 | 0.123 | 0.172 | 0.186 | 0.344 | 1.441 |
| Fourth power Model | Var[f4(x)] | 0.223 | 0.169 | 0.132 | 0.142 | 0.154 | 0.145 | 0.222 | 0.265 | 0.355 | 4.947 |
| Fifth power Model | Var[f5(x)] | 0.119 | 0.098 | 0.056 | 0.061 | 0.052 | 0.053 | 0.051 | 0.055 | 0.083 | 0.73 |

| Sample Size = 1000 | | | | | | | | | | | |
|--------------------|------------|---------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| | x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Function | f(X) | 1.4403 | 2.1677 | 3.33 | 8.1854 | 17.9183 | 29.161 | 36.7773 | 39.636 | 43.0998 | 54.6093 |
| Linear Model | E[f1(x)] | -2.7969 | 3.0971 | 8.991 | 14.885 | 20.779 | 26.673 | 32.5669 | 38.4609 | 44.3549 | 50.2489 |
| Quadratic Model | E[f2(x)] | -0.5884 | 3.2766 | 7.7215 | 12.7463 | 18.3511 | 24.5359 | 31.3006 | 38.6452 | 46.5698 | 55.0743 |
| Cubic Model | E[f3(x)] | -0.0243 | 0.6806 | 4.5531 | 10.7309 | 18.3514 | 26.5522 | 34.4709 | 41.2449 | 46.0119 | 47.9094 |
| Fourth power Model | E[f4(x)] | -0.1597 | 0.4532 | 4.4917 | 10.8624 | 18.5643 | 26.6881 | 34.4172 | 41.0266 | 45.8838 | 48.4483 |
| Fifth power Model | E[f5(x)] | 2.4813 | 1.4532 | 2.7151 | 8.8439 | 18.5586 | 28.6958 | 36.1856 | 40.0271 | 43.2642 | 54.9609 |
| Linear Model | Var[f1(x)] | 0.0028 | 0.0021 | 0.0016 | 0.0013 | 0.0012 | 0.0012 | 0.0015 | 0.002 | 0.0026 | 0.0034 |
| Quadratic Model | Var[f2(x)] | 0.0036 | 0.0025 | 0.0026 | 0.003 | 0.003 | 0.0025 | 0.002 | 0.002 | 0.0038 | 0.009 |
| Cubic Model | Var[f3(x)] | 0.0042 | 0.0031 | 0.0033 | 0.0027 | 0.0022 | 0.0025 | 0.003 | 0.0029 | 0.0037 | 0.0143 |
| Fourth power Model | Var[f4(x)] | 0.0041 | 0.0035 | 0.003 | 0.0035 | 0.004 | 0.0034 | 0.0033 | 0.0042 | 0.0038 | 0.0254 |
| Fifth power Model | Var[f5(x)] | 0.0055 | 0.0049 | 0.0041 | 0.0043 | 0.0037 | 0.0044 | 0.0044 | 0.0045 | 0.0066 | 0.0332 |