# Project #4: Functional Decomposition

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1. What your own-choice quantity was and how it fits into the simulation.

   I took the amount of pesticides sprayed over the grains every month as my own choice quantity. So if the amount of pesticides sprayed every month increases by 50% than the usual amount of pesticides sprayed, the height of the grain decreases by 0.05 inches for every extra percent of pesticides used.

2. A table showing values for temperature, precipitation, number of graindeer, height of the grain, and your own-choice quantity as a function of month number.

| Now Month | Now NumDeer | Now Precip | Now Temp | Now Height | Pesticides Used |
|---|---|---|---|---|---|
| 0 | 2 | 14.241253 | -3.59275 | 0.796129 | 4.1 |
| 1 | 1 | 25.149177 | 0.844801 | 11.60841 | 6.5 |
| 2 | 2 | 34.970879 | 2.321667 | 23.668819 | 3.1 |
| 3 | 3 | 32.656541 | 12.701412 | 23.18538 | 4.1 |
| 4 | 4 | 21.250612 | 12.654896 | 21.602671 | 1.9 |
| 5 | 5 | 23.12526 | 25.539627 | 16.522683 | 1.5 |
| 6 | 6 | 11.079989 | 21.747284 | 10.173589 | 7.2 |
| 7 | 5 | 1.276859 | 21.560677 | 0 | 1.1 |
| 8 | 4 | 0 | 15.49413 | 0 | 7.8 |
| 9 | 3 | 0 | 9.331551 | 0 | 6.9 |
| 10 | 2 | 8.61111 | 3.679926 | 6.658261 | 3.7 |
| 11 | 3 | 8.907712 | -3.021394 | 6.308645 | 2.3 |

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|---|---|---|---|---|---|
| 12 | 2 | 19.607265 | -2.093686 | 7.327389 | 2.9 |
| 13 | 3 | 31.090874 | -3.309166 | 7.542806 | 6.3 |
| 14 | 2 | 33.440483 | 1.71203 | 16.514521 | 7.5 |
| 15 | 3 | 29.625541 | 16.7921 | 10.940955 | 0.4 |
| 16 | 4 | 30.860066 | 12.896818 | 9.047752 | 0.5 |
| 17 | 3 | 22.811253 | 17.363116 | 4.05792 | 4.9 |
| 18 | 2 | 14.350318 | 16.779327 | 0.369488 | 7.5 |
| 19 | 1 | 9.399322 | 20.4056 | 0 | 9.9 |
| 20 | 0 | 0.516853 | 9.35805 | 0 | 2.7 |
| 21 | 1 | 5.304563 | 6.789364 | 9.093108 | 6.1 |
| 22 | 2 | 0.356938 | 1.59626 | 12.336309 | 6.2 |
| 23 | 3 | 10.180385 | 4.535065 | 22.458966 | 1.7 |
| 24 | 4 | 14.37536 | 1.27494 | 30.803854 | 7.9 |
| 25 | 5 | 25.698693 | -0.842955 | 30.25349 | 6.1 |
| 26 | 6 | 29.101274 | 2.657119 | 40.443546 | 2.2 |
| 27 | 7 | 28.095359 | 16.167931 | 33.057478 | 1.3 |
| 28 | 8 | 29.353797 | 20.951572 | 24.170383 | 4.9 |
| 29 | 9 | 17.853934 | 20.589625 | 14.01438 | 7.1 |
| 30 | 8 | 6.462121 | 21.875233 | 0 | 6.1 |

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|---|---|---|---|---|---|
| 31 | 7 | 2.998555 | 21.313549 | 0 | 0.8 |
| 32 | 6 | 0 | 16.276981 | 0 | 8.1 |
| 33 | 5 | 5.101647 | 11.122195 | 0 | 6.7 |
| 34 | 4 | 6.300999 | 5.224105 | 2.810344 | 8 |
| 35 | 3 | 15.980684 | 2.991772 | 10.459186 | 4.7 |
| 36 | 4 | 14.853707 | 1.549986 | 19.685826 | 8.3 |
| 37 | 5 | 30.661316 | 2.552783 | 27.750385 | 8.8 |
| 38 | 6 | 29.135479 | 6.213837 | 34.541462 | 3 |
| 39 | 7 | 33.383893 | 11.560402 | 30.490053 | 1.2 |
| 40 | 8 | 28.314623 | 14.968537 | 22.154341 | 7.4 |
| 41 | 9 | 15.289982 | 19.972653 | 8.953359 | 7.8 |
| 42 | 8 | 9.361 | 17.664875 | 0 | 3.3 |
| 43 | 7 | 3.214359 | 15.021201 | 0 | 2.3 |
| 44 | 6 | 0 | 16.292864 | 0 | 5.8 |
| 45 | 5 | 0 | 10.182343 | 0 | 8.3 |
| 46 | 4 | 5.813629 | 7.658242 | 0 | 7.6 |
| 47 | 3 | 11.391906 | 0.388724 | 0.415876 | 5.9 |
| 48 | 2 | 16.130744 | 2.980031 | 12.055342 | 7.7 |
| 49 | 3 | 28.353151 | -3.012517 | 9.394676 | 8.5 |

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|---|---|---|---|---|---|
| 50 | 4 | 27.859598 | 3.767692 | 20.973519 | 2.5 |
| 51 | 5 | 27.062571 | 15.879627 | 16.185984 | 1.8 |
| 52 | 6 | 21.552643 | 15.736966 | 10.154839 | 9.8 |
| 53 | 5 | 18.340265 | 21.372401 | 0 | 1.6 |
| 54 | 4 | 13.180745 | 16.465232 | 0 | 10 |
| 55 | 3 | 8.457466 | 22.9673 | 0 | 7.9 |
| 56 | 2 | 5.576943 | 8.832815 | 0 | 8.8 |
| 57 | 1 | 0 | 1.879491 | 0 | 3.6 |
| 58 | 0 | 5.89969 | 2.398542 | 8.571233 | 5.3 |
| 59 | 1 | 12.089427 | 4.702447 | 23.597399 | 7.2 |
| 60 | 2 | 20.962194 | 1.273388 | 33.762343 | 9.5 |
| 61 | 3 | 30.229758 | 0.610438 | 37.679883 | 9.3 |
| 62 | 4 | 34.203629 | 7.461656 | 41.825834 | 3.9 |
| 63 | 5 | 27.004028 | 10.46588 | 42.997627 | 7.8 |
| 64 | 6 | 29.131139 | 17.543587 | 33.168208 | 0.5 |
| 65 | 7 | 19.329683 | 16.9735 | 25.666859 | 1.5 |
| 66 | 8 | 6.867575 | 24.211595 | 16.776897 | 5.6 |
| 67 | 7 | 0 | 17.630335 | 5.881634 | 2.6 |
| 68 | 6 | 0 | 17.3526 | 0 | 6.2 |

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|---|---|---|---|---|---|
| 69 | 5 | 0 | 9.18791 | 0 | 6.5 |
| 70 | 4 | 1.850299 | 5.712357 | 0 | 5.7 |
| 71 | 3 | 11.219956 | -2.840765 | 0 | 6.9 |

3. A graph showing temperature, precipitation, number of graindeer, height of the grain, and your own-choice quantity as a function of month number. Note: if you change the units to °C and centimeters, the quantities might fit better on the same set of axes.

   cm = inches * 2.54
   °C = (5./9.)*(°F-32)

   This will make your heights have larger numbers and your temperatures have smaller numbers.

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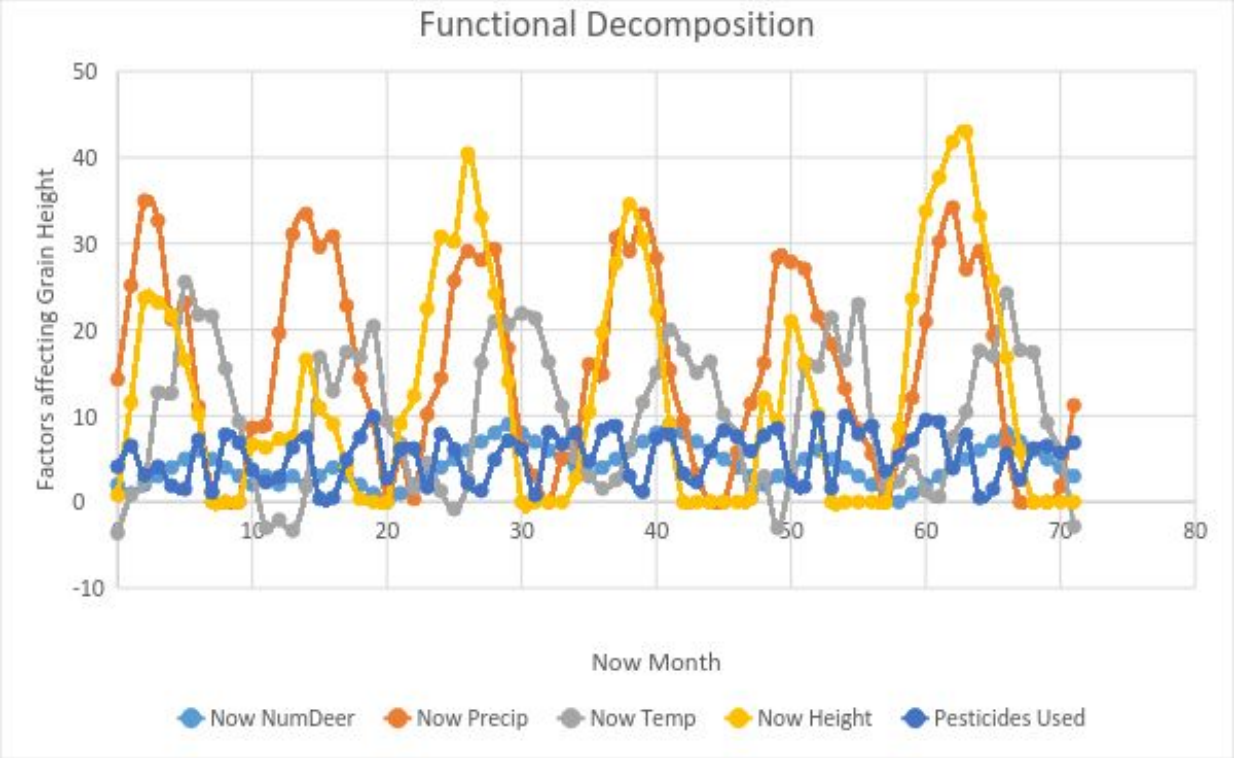


4. A commentary about the patterns in the graph and why they turned out that way. What evidence in the curves proves that your own quantity is actually affecting the simulation?

   From the graph, we can see that there are various factors, i.e., number of deers (Now NumDeer), Precipitation(Now Precip), Temperature(Now Temp) and Pesticides used that are affecting grain height. We can see that as the number of deer increases(curve goes up), the grain height decreases(curve goes down) and vice-versa since an increase in the number of deers will result in more consumption of grains and thus the grain height will decrease. Similarly, a decrease in the number of deers(curve goes down) would cause the grain height to increase(curve goes up) as there will be less consumption of grains. Also,

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we can see from the graph that as the temperature and precipitation conditions are idle, the grain height remains stable but if the temperature and precipitation conditions are not idle, the grain height also decreases(curve goes down) as idle temperature and precipitation are one of the two major factors that affect the grain height.
Talking about the fourth factor, i.e., pesticides used, if the amount of pesticides sprayed every month increases by 50% than the usual amount of pesticides sprayed(curve goes up), the height of the grain decreases by 0.05 inches for every extra percent of pesticides used(curve goes down), else the grain height remains stable.