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IE 415

Winter 2015

3/5/2015

Homework #5

1. Lag correlations:



Plots:

2.

a) Attached

b) Attached

c) 49.26

d) Attached

e) Attached

f) My result was a Weibull fit. I did not expect this to occur as my resulting data was primarily from an exponential fit. I thought it would be an exponential distribution, following the patterns of the initial data. I am not familiar enough with the Weibull distribution.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Distribution** | **A-D** | **A-D P-Value** | **K-S** | **K-S P-Value** | **Chi-Square** | **Chi-Square P-Value** |
| Weibull | 0.2976 | 0.926 | 0.0263 | 0.841 | 20.9319 | 0.283 |
| Gamma | 0.3233 | 0.662 | 0.0272 | 0.621 | 17.4048 | 0.495 |
| Exponential | 0.5860 | 0.377 | 0.0358 | 0.309 | 23.4890 | 0.265 |
| Lognormal | 1.4682 | 0.000 | 0.0375 | 0.048 | 33.0120 | 0.017 |
| Max Extreme | 7.8493 | 0.000 | 0.0891 | 0.000 | 92.4429 | 0.000 |
| Logistic | 14.9162 | 0.000 | 0.1588 | 0.000 | 208.7475 | 0.000 |
| Student's t | 21.4076 | --- | 0.1505 | --- | 268.5311 | 0.000 |
| Normal | 22.7011 | 0.000 | 0.1508 | 0.000 | 264.8277 | 0.000 |
| Min Extreme | 47.2379 | 0.000 | 0.2703 | 0.000 | 679.2565 | 0.000 |
| Pareto | 139.7527 | --- | 0.4052 | --- | 1492.6834 | 0.000 |
| Triangular | 143.7701 | --- | 0.3476 | --- | 326.0220 | 0.000 |
| Beta | 229.7179 | --- | 0.1202 | --- | 115.0160 | 0.000 |
| BetaPERT | 327.9610 | --- | 0.2710 | --- | 334.6633 | 0.000 |
| Uniform | 350.5154 | 0.000 | 0.5192 | 0.000 | 889.8216 | 0.000 |

3.

Verification: Encompasses debugging and ensuring that the simulation model works as intended. . Examples of verification are adding debugging features, animated variables, and “record” modules.

Validation: Ensuring or providing evidence that the simulation model is an adequate model of the real system. The validation can be in regards to a representation of an existing model or possible future model. In general validation is the more difficult of the two to accomplish.

4.

1) Adding debugging features or modules throughout the creation of the simulation so that while building the model we have a better idea of where the errors are occurring.

2) Use built in debuggers to isolate portions of large models and run them separately.

5. a) Terminating simulation: Due to the fact that we want to be able to adapt our model to changing variables we want a termination simulation. We will want to estimate appropriate staffing levels for many different conditions on any given day.

b) steady-state: No time period is defined. In this case we wish to know what the resulting behavior of investments will look like possibly years down the road.

c) Terminating simulation: You do not care about the long term results of the simulation since you are only running it for a week at a time. What you want is the end result for this week after supplying the initial conditions.

6. Time period used to minimize any impact the initial conditions might have on the simulation. It is primarily used when you have a low number of samples in the system.

7.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Generate a 95% confidence interval | | | |  |  |
| **chk slides** | z(1-alpha/2) | 1.96 | 465 simulation replications should be conducted | | |
|  | s = std dev | 5.5 |
|  | h | 0.5 |
|  |  |  |
|  | **n** | **465** |  |  |  |

8.



Sample data for problem 2.

