Performance Modeling of Computer Systems and Networks

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Simulation:
point estimation, sample size and confidence interval

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$k = 0.7285$, $p = 100.0$, $\alpha = 1.5$, $E(X) = 2$

$\sigma^2 = 13.071378553$, $s = 3.6154$

Stream 2

```
for a sample of size 10
mean ................ =   2.250   based upon 10 data points and with 95%
standard deviation ... =   2.002   confidence
minimum ............. =   0.760   the expected value is in the interval      2.25
maximum ............. =   6.850   +/-   1.51

for a sample of size 100
mean ................ =   1.748   based upon 100 data points and with 95%
standard deviation ... =   1.947   confidence
minimum ............. =   0.730   the expected value is in the interval      1.75
maximum ............. =  17.540   +/-   0.39

for a sample of size 1000
mean ................ =   2.026   based upon 1000 data points and with 95%
standard deviation ... =   3.474   confidence
minimum ............. =   0.730   the expected value is in the interval      2.03
maximum ............. =  50.620   +/-   0.22
```

2

$k = 0.7285,\ p = 100.0,\ \alpha = 1.5,\ E(X) = 2$

$\sigma^2 = 13.071378553,\ s = 3.6154$

Stream 2

```
for a sample of size 10000
mean ................. =   1.972
standard deviation ... =   3.547
minimum .............. =   0.730
maximum .............. =  92.980
```

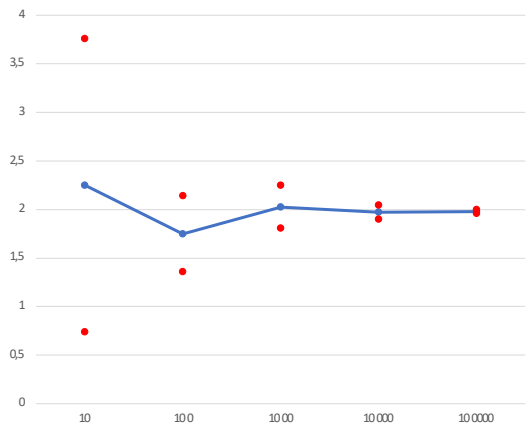
```
based upon 10000 data points and with 95%
confidence
the expected value is in the interval      1.97
+/-   0.07
```

```
for a sample of size 100000
mean ................. =   1.978
standard deviation ... =   3.526
minimum .............. =   0.730
maximum .............. =  99.230
```

```
based upon 100000 data points and with 95%
confidence
the expected value is in the interval      1.98
+/-   0.02
```

3

Stream 2



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$k = 0.7285,\ p = 100.0,\ \alpha = 1.5,\ E(X) = 2$

$\sigma^2 = 13.071378553,\ s = 3.6154$

Stream 2

```
for a sample of size 10
mean ................ =   2.250   based upon 10 data points and with 95%
standard deviation ... =   2.002   confidence
minimum ............. =   0.760   the expected value is in the interval     2.25
maximum ............. =   6.850   +/-   1.51
```

Stream 59

```
for a sample of size 10
mean ................ =   1.090   based upon 10 data points and with 95%
standard deviation ... =   0.497   confidence
minimum ............. =   0.730   the expected value is in the interval     1.09
maximum ............. =   2.390   +/-   0.37
```

5

$k = 0.7285,\ p = 100.0,\ \alpha = 1.5,\ E(X) = 2$

$\sigma^2 = 13.071378553,\ s = 3.6154$

Stream 2

```
for a sample of size 100
mean ................ =   1.748   based upon 100 data points and with 95%
standard deviation ... =   1.947   confidence
minimum ............. =   0.730   the expected value is in the interval     1.75
maximum ............. =  17.540   +/-   0.39
```

Stream 59

```
for a sample of size 100
mean ................ =   2.092   based upon 100 data points and with 95%
standard deviation ... =   4.850   confidence
minimum ............. =   0.730   the expected value is in the interval     2.09
maximum ............. =  44.420   +/-   0.97
```

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k = 0.7285, p = 100.0, α = 1.5, E(X)= 2

σ^2= 13.071378553, s=3.6154

Stream 2

```
for a sample of size 1000
mean ................ =   2.026    based upon 1000 data points and with 95%
standard deviation ... =   3.474    confidence
minimum ............. =   0.730    the expected value is in the interval      2.03
maximum ............. =  50.620    +/-   0.22
```

Stream 59

```
for a sample of size 1000
mean ................ =   1.983    based upon 1000 data points and with 95%
standard deviation ... =   3.674    confidence
minimum ............. =   0.730    the expected value is in the interval      1.98
maximum ............. =  68.420    +/-   0.23
```

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k = 0.7285, p = 100.0, α = 1.5, E(X)= 2

σ^2= 13.071378553, s=3.6154

Stream 2

```
for a sample of size 10000              based upon 10000 data points and with 95%
mean ................ =   1.972          confidence
standard deviation ... =   3.547          the expected value is in the interval      1.97
minimum ............. =   0.730          +/-   0.07
maximum ............. =  92.980
```

Stream 59

```
for a sample of size 10000              based upon 10000 data points and with 95%
mean ................ =   1.972          confidence
standard deviation ... =   3.453          the expected value is in the interval      1.97
minimum ............. =   0.730          +/-   0.07
maximum ............. =  84.900
```

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k = 0.7285, p = 100.0, α = 1.5, E(X)= 2

σ^2= 13.071378553, s=3.6154

Stream 2

```
for a sample of size 100000
mean ................. =   1.978
standard deviation ... =   3.526
minimum .............. =   0.730
maximum .............. =  99.230
```

```
based upon 100000 data points and with 95%
confidence
the expected value is in the interval      1.98
+/-   0.02
```

Stream 59

```
for a sample of size 100000
mean ................. =   1.991
standard deviation ... =   3.605
minimum .............. =   0.730
maximum .............. =  99.290
```

```
based upon 100000 data points and with 95%
confidence
the expected value is in the interval      1.99
+/-   0.02
```

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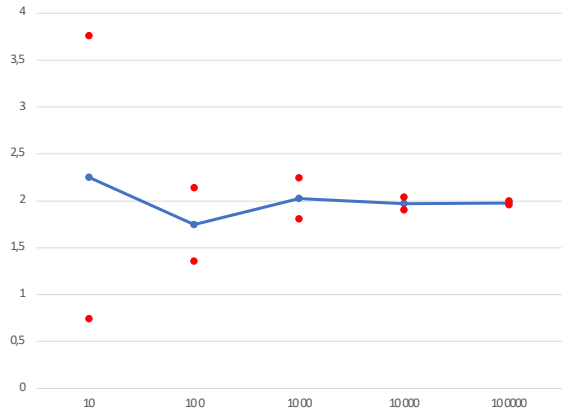
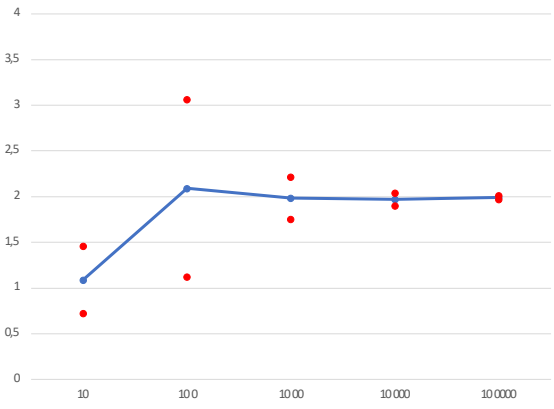
Stream 2



Stream 59



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M/M/1

Stream 0 arrivi media 2.5, Stream 1 servizi media 2

```
for 8027 jobs
   average interarrival time =   2.49
   average wait ............ =   8.88
   average delay ........... =   6.90
   average service time .... =   1.99
   average # in the node ... =   3.57
   average # in the queue .. =   2.77
   utilization ............. =   0.80
```

M/BP/1

Stream 0 arrivi media 2.5, Stream 1 servizi media 2

```
for 8027 jobs
   average interarrival time =   2.49
   average wait ............ =  10.02
   average delay ........... =   8.12
   average service time .... =   1.90
   average # in the node ... =   4.02
   average # in the queue .. =   3.26
   utilization ............. =   0.76
```

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M/M/1

Stream 0 arrivi media 2.5, Stream 1 servizi media 2

```
for 8027 jobs
   average interarrival time =   2.49
   average wait ............ =   8.88
   average delay ........... =   6.90
   average service time .... =   1.99
   average # in the node ... =   3.57
   average # in the queue .. =   2.77
   utilization ............. =   0.80

 for 399391 jobs
    average interarrival time =   2.50
    average wait ............ =  10.06
    average delay ........... =   8.06
    average service time .... =   2.00
    average # in the node ... =   4.02
    average # in the queue .. =   3.22
    utilization ............. =   0.80
```

M/BP/1

Stream 0 arrivi media 2.5, Stream 1 servizi media 2

```
for 8027 jobs
   average interarrival time =   2.49
   average wait ............ =  10.02
   average delay ........... =   8.12
   average service time .... =   1.90
   average # in the node ... =   4.02
   average # in the queue .. =   3.26
   utilization ............. =   0.76

for 399391 jobs
   average interarrival time =   2.50
   average wait ............ =  19.47
   average delay ........... =  17.47
   average service time .... =   2.00
   average # in the node ... =   7.78
   average # in the queue .. =   6.98
   utilization ............. =   0.80
```

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