

ICMA393 Discrete Simulation: HW5

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1. Toilet Problem

I ran the simulation for $N = 100000$ iterations, for the $\text{Expo}(\text{Expo}(\text{Expo}(\text{Expo}(371))))$.

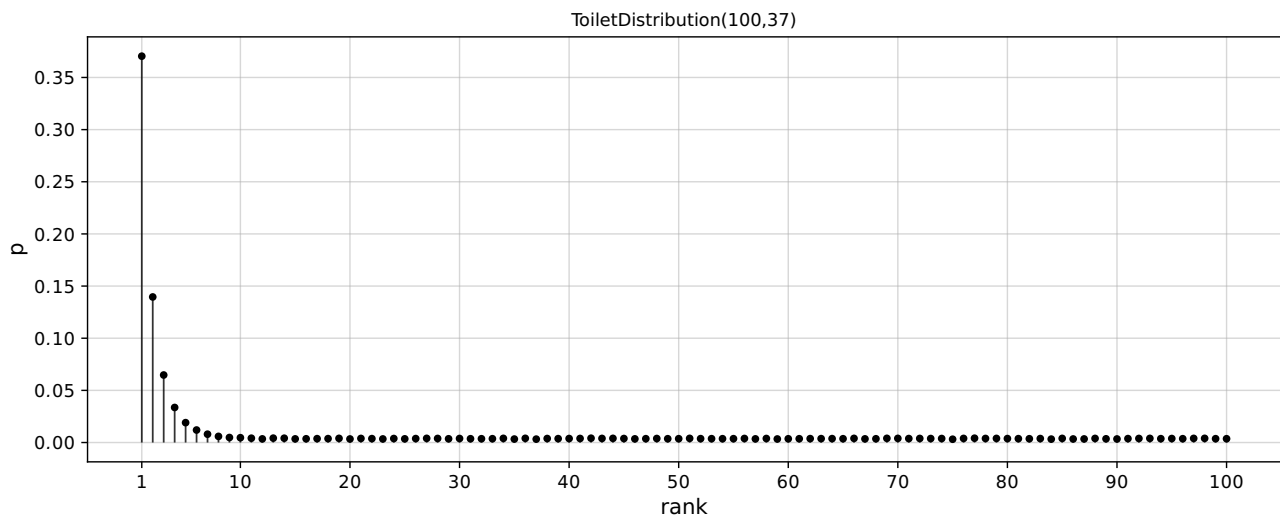


Figure 1: The chained exponential distributions seems to follow Benford's law.

```
[0.3704 , 0.13956, 0.06473, 0.03361, 0.01906, 0.01199, 0.00799,  
0.00589, 0.00481, 0.00463, 0.00414, 0.00349, 0.0042 , 0.00413,  
0.00349, 0.00359, 0.00371, 0.00374, 0.00399, 0.00341, 0.00391,  
0.00374, 0.00344, 0.00383, 0.00353, 0.00379, 0.004 , 0.0039 ,  
0.00359, 0.00386, 0.00363, 0.00363, 0.00366, 0.00399, 0.00333,  
0.00402, 0.00326, 0.00383, 0.00372, 0.00382, 0.00388, 0.00413,  
0.00392, 0.00399, 0.00383, 0.00351, 0.00367, 0.00385, 0.00364,  
0.00367, 0.00398, 0.00372, 0.00369, 0.00366, 0.00369, 0.00388,  
0.0035 , 0.00386, 0.0034 , 0.0036 , 0.00364, 0.00374, 0.00373,  
0.00374, 0.00364, 0.00397, 0.0035 , 0.0036 , 0.00401, 0.00397,  
0.0038 , 0.0039 , 0.00382, 0.00383, 0.00316, 0.00393, 0.00414,  
0.00389, 0.00394, 0.00379, 0.00371, 0.00363, 0.0038 , 0.00327,  
0.00395, 0.00341, 0.00344, 0.00393, 0.00356, 0.0034 , 0.00376,  
0.00389, 0.00396, 0.00369, 0.00382, 0.00366, 0.00396, 0.004 ,  
0.00367, 0.00364]
```

2. Toilet Problem

Source Code

<https://github.com/AustinMaddison/discrete-simulation/tree/main/hw5/source>