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2K18/MC/114

Experiment 2

Objective:

Demonstrating a Stochastic Process with Discrete Index Set

(a) with discrete state space, (b) with continuous state space.

Theory:

A stochastic process is a family of random variables {X(t), t ∈ T} defined on a given probability space, indexed by parameter t, where t varies over an index set T. The values assumed byX(t) are called its states, and the set of all possible values forms the state pace of the process.

Stochastic processes are classified on the basis of the underlying index set T and state space S. If T = {0,1,2,..}, or T = {0, ±1, ±2,..}, the stochastic process is said to be discrete parameter process and is usually indicated by {Xn} .The state space is classified as discrete if it is finite or countable and process is classified as continuous if it consists of an interval, finite or infinite of the real line.

Code:

A: Discrete state space

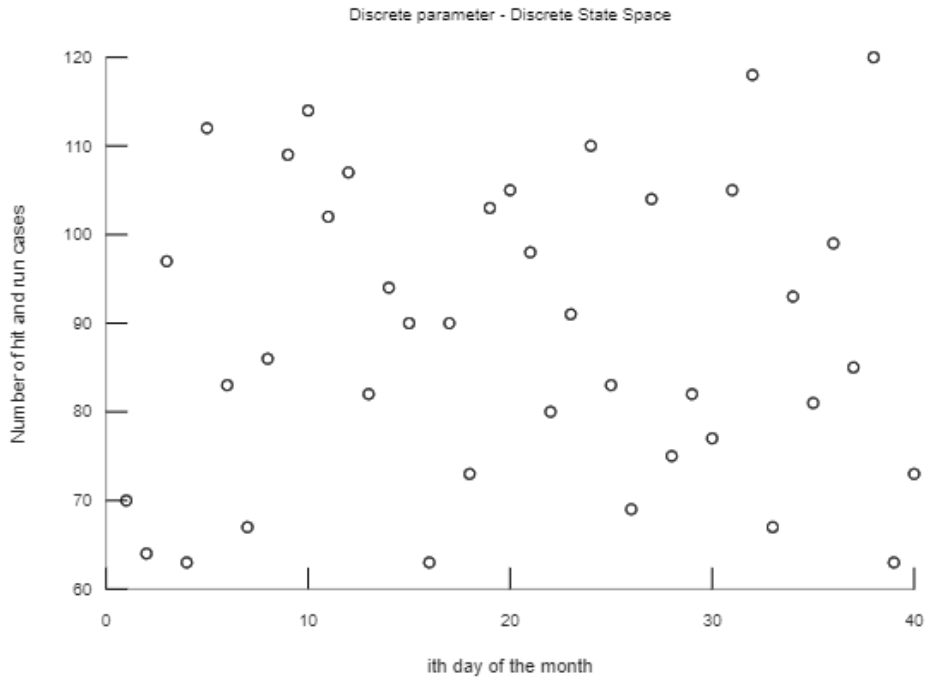
```
x = [1:1:40];

y = 60 +randi ([0 60], 40, 1);

p = scatter (x,y);

xlabel ("ith day of the month");
```

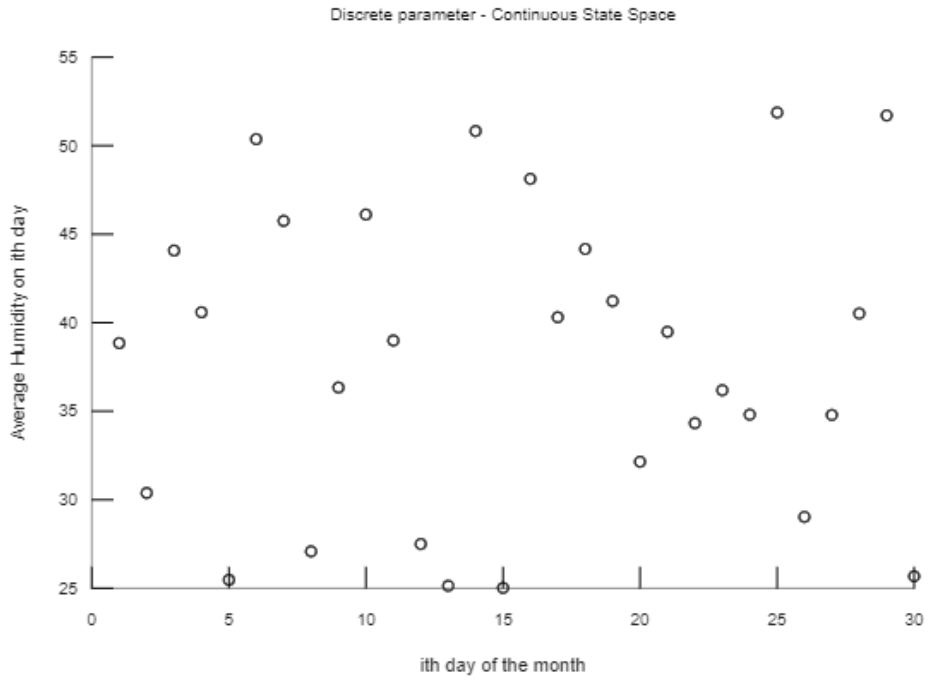
```
ylabel ("Number of hit and run cases");
title ("Discrete parameter - Discrete State Space");
```

B: Continuous state space

```
x = [1:1:30];
y = 25 + 27 * rand(30, 1);
p = scatter (x,y);
xlabel ("ith day of the month");
ylabel ("Average Humidity on ith day");
title ("Discrete parameter - Continuous State Space");
```

Result:





Discussion:

The graphs for demonstrating a stochastic process with discrete index set

(A) with discrete state space, (ith day vs No. of hit and run cases)

(B) with continuous state space (ith day vs Average Humidity on ith day) are obtained.