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Problem 3: Checking the Markov property

(6/7 points)

For each one of the following definitions of the state X_k at time k (for $k = 1, 2, \dots$), determine whether the Markov property is satisfied by the sequence X_1, X_2, \dots .

1. A fair six-sided die (with sides labelled $1, 2, \dots, 6$) is rolled repeatedly and independently.

(a) Let X_k denote the largest number obtained in the first k rolls. Does the sequence X_1, X_2, \dots satisfy the Markov property?

Yes ▾



(b) Let X_k denote the number of **6**'s obtained in the first k rolls, up to a maximum of ten. (That is, if ten or more **6**'s are obtained in the first k rolls, then $X_k = 10$.) Does the sequence X_1, X_2, \dots satisfy the Markov property?

Yes ▾



(c) Let Y_k denote the result of the k^{th} roll. Let $X_1 = Y_1$, and for $k \geq 2$, let $X_k = Y_k + Y_{k-1}$. Does the sequence X_1, X_2, \dots satisfy the Markov property?

► Unit 6: Further topics on random variables

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▼ **Unit 10: Markov chains**

Unit overview

Lec. 24: Finite-state Markov chains

Exercises 24 due May 18, 2016 at 23:59 UTC 

Lec. 25: Steady-state behavior of Markov chains

Exercises 25 due May 18, 2016 at 23:59 UTC 

No ▼



(d) Let $Y_k = 1$ if the k^{th} roll results in an odd number; and $Y_k = 0$ otherwise. Let $X_1 = Y_1$, and for $k \geq 2$, let $X_k = Y_k \cdot X_{k-1}$. Does the sequence X_1, X_2, \dots satisfy the Markov property?

Yes ▼



2. Let Y_k be the state of some Markov chain at time k (i.e., it is known that the sequence Y_1, Y_2, \dots satisfies the Markov property).

(a) For a fixed integer $r > 0$, let $X_k = Y_{r+k}$. Does the sequence X_1, X_2, \dots satisfy the Markov property?

Yes ▼



(b) Let $X_k = Y_{2k}$. Does the sequence X_1, X_2, \dots satisfy the Markov property?

No ▼



(c) Let $X_k = (Y_k, Y_{k+1})$. Does the sequence X_1, X_2, \dots satisfy the Markov property?

Yes ▼



Lec. 26: Absorption probabilities and expected time to absorption

Exercises 26 due May 18, 2016 at 23:59 UTC

Solved problems

Problem Set 10

Problem Set 10 due May 18, 2016 at 23:59 UTC

► Exit Survey

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DISCUSSION

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