MATH 611

Homework 5

1. For the Markov Chain described by the transition matrix:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **1** | **2** | **3** |
| **1** | 0.8 | 0 | 0.2 |
| **2** | 0.4 | 0.3 | 0.3 |
| **3** | 0 | 0.9 | 0.1 |

Examine whether the states are periodic and if yes determine their period.

1. For the MC described with the transition matrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **0** | **1** | **2** | **3** |
| **0** | 1 | 0 | 0 | 0 |
| **1** | 0.6 | 0 | 0.4 | 0 |
| **2** | 0 | 0.6 | 0 | 0.4 |
| **3** | 0 | 0 | 0 | 1 |

Determine if states 1 and 2 are periodic and if so, determine their period.

1. Let . Find the MLE of the parameter .
2. Let and consider .
   1. Find the Bayes estimator of .
   2. Show that the Bayes estimator is a weighted average of the MLE and the prior mean.
3. For , is a sufficient statistic for ?