MarkovFPT.wls (Mathematica 12)

Example 1

The script is presented with values for the transition matrix “a0” and initial state (within braces {} in “p0”) corresponding to Example 1 (Figs. 2 and 3 of the article):

a0 **= {{**1, 0, 0, 0**}**, **{**0.2, 0.1, 0.2, 0.5**}**, **{**0, 0.4, 0.4, 0.2**}**, **{**0.4, 0.3, 0, 0.3**}}**;

p0 **=** DiscreteMarkovProcess**[{**0, 1**/**3, 1**/**3, 1**/**3**}**, a0**]**;

To obtain the simulations corresponding to Examples 2 and 3 (Figs. 4 and 5 of the article) you must change the values of the transition matrix and initial state vector according to the data provided in section 3 of the article:

Example 2

a0 **= {{**1, 0, 0, 0, 0, 0, 0**}**, **{**0.1, 0, 0.3, 0.6, 0, 0, 0**}**, **{**0, 0.1, 0.5, 0.4, 0, 0, 0**}**, **{**0**,** 0.4, 0.6, 0, 0, 0, 0**}, {**0.5, 0, 0, 0, 0.4, 0.1, 0**}, {**0, 0, 0, 0, 0.2, 0, 0.8**}, {**0, 0, 0, 0, 0.5, 0.3, 0.2**}};**

For FPT distribution corresponding to Fig 4 (below left), set initial state vector

p0 **=** DiscreteMarkovProcess**[{**0, 0, 0, 0, 1**/**3, 1**/**3, 1**/**3**}**, a0**]**;

For FPT distribution corresponding to Fig 4 (below right), set initial state vector

p0 **=** DiscreteMarkovProcess**[{**0, 1**/**3, 1**/**3, 1**/**3, 0, 0, 0**}**, a0**]**;

Example 3

a0 **= {{**1, 0, 0, 0, 0, 0, 0**}**, **{**0.1, 0, 0.3, 0.6, 0, 0, 0**}**, **{**0, 0.1, 0.5, 0.4, 0, 0, 0**}**, **{**0**,** 0.4, 0, 0, 0, 0, 0.6**}, {**0.5, 0, 0, 0, 0.4, 0.1, 0**}, {**0, 0, 0, 0, 0.2, 0, 0.8**}, {**0, 0, 0, 0, 0.5, 0.3, 0.2**}};**

For FPT distribution corresponding to Fig 5, set initial state vector

p0 **=** DiscreteMarkovProcess**[{**0, 1**/**3, 1**/**3, 1**/**3, 0, 0, 0**}**, a0**]**;