I. INTRO

The Markov chain for the system can be defined by the transition matrix as below.

$$\mathbf{X} = \begin{pmatrix} 0 & A & B & C & \cdots & 0 \\ 0 & 0 & A & B & \cdots & 0 \\ \cdots & & & & & \\ 0 & 0 & 0 & 0 & \cdots & 0 \end{pmatrix}, \mathbf{X} \in \mathbb{R}^{n \times n}$$

(1)

where from this we can compute for the output distribution.

$$v_{in} = \begin{pmatrix} 1 & 0 & 0 & \cdots & 0 \end{pmatrix}, \tag{2}$$

$$v_{out} = v_{in} \mathbf{X}^i, \tag{3}$$

$$v_{out}, v_{in} \in \mathbb{R}^{1 \times n}. \tag{4}$$

where $\mathbf{X}$ is the transition matrix, A, B, C are the respective probabilities of transition, i is the number of iteration, n is the number of possible states.