Chapter 1

Simulating a Markov Modulated Fluid Model

From a generator matrix, a fluid jump matrix and a vector of fluid rates, the lifetime of a Markov Modulated Fluid Model is simulated in Matlab. For three different states with fluid rates 1, 2 and 3 respectively and transition intensities given by generator matrix

$$G = \begin{bmatrix} -3 & 1 & 2 \\ 1 & -2 & 1 \\ 0 & 1 & -1 \end{bmatrix}. \tag{1.1}$$

A jump matrix with one jump is chosen

$$G = \begin{bmatrix} 0 & 0 & 5 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}. \tag{1.2}$$

We've simulated some samples with and without jumps, this results in the following hazard rates:

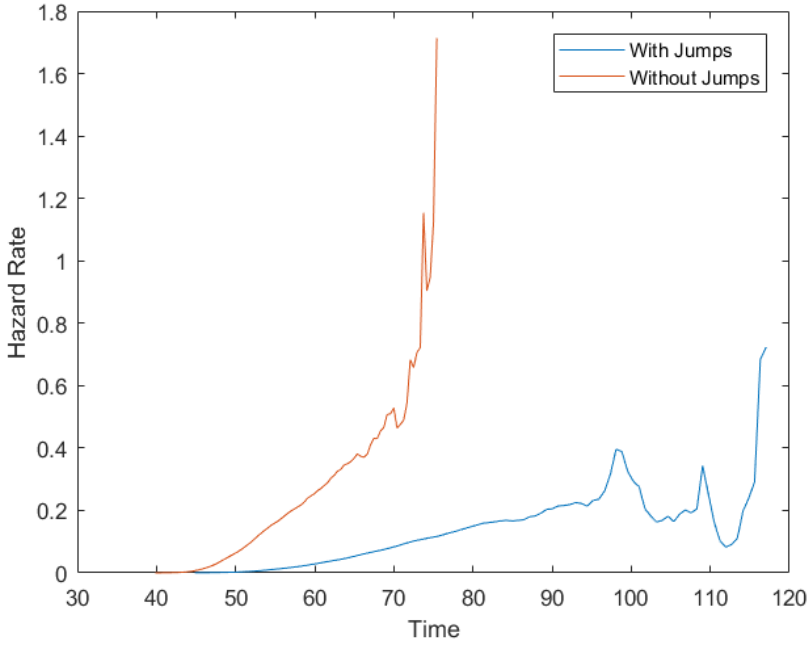

Figure 1.1: The hazard rates of the simulated data.

As you can see, jumps increase the lifetime and make the hazard function less increasing.