Supplementary Material for the manuscript titled “A stochastic model for transmission, extinction and outbreak of *Escherichia coli* O157:H7 in cattle as affected by ambient temperature and cleaning practices” by Xueying Wang, Raju Gautam, Pablo J. Pinedo, Linda J. S. Allen, Renata Ivanek
Figure 1: The snapshots of the probability density function (PDF) of $X(t) = (P_I, P_E)^T$ over one-year period starting with March as the pathogen cleaning rate $r_E = 0.17$ CFU per day (which represents the scenario of no cleaning for the dairy farm). The panels from the top to the bottom display the associate PDF of $X(t)$ in spring, summer, fall and winter, respectively.
Figure 2: The snapshots of the PDF of $\mathbf{X}(t) = (P_I, P_E)^T$ over one-year period starting with March as the pathogen cleaning rate $r_E = 0.40$ CFU per day (which represents the scenarios where cleaning of the dairy farm is done once per week). The panels from the top to the bottom display the associate PDF of $\mathbf{X}(t)$ in spring, summer, fall and winter, respectively.
Figure 3: The expected time to the first apparent extinction in each of the four seasons cleaning of a dairy farm twice a week (i.e., $r_E = 0.63$ CFU per day). Note that the displayed value of the expected time only makes sense if it does not go beyond the duration of a season.
Figure 4: The expected time (in days) to the first $\theta$ outbreak as a function of the initial position of the sample paths. Four cleaning scenarios are considered, including no cleaning, farm cleaning twice a week, one time a week and once a day (namely, $r_E = 0.17$, $r_E = 0.40$, $r_E = 0.63$, and $r_E = 1.78$), which are displayed from the left to the right panel. The outbreak criterion $\theta$ is 5% and 10% from the top panel to the bottom panel.
Figure 5: The mean time (in days) to the first $\theta$ outbreak of the criterion as a function of the initial position of the sample paths when the growth rate is frozen to the average growth rate during summer. The pathogen cleaning rate $r_E = 0.17, r_E = 0.40, r_E = 0.63$ and $r_E = 1.78$ from the left to the right panel. The outbreak criterion $\theta$ is 5%, and 10% of the total population size of the hosts from the top panel to the bottom panel.