Discussion for part 4:

1. Do you observe any periodic fluctuations in the signals due to periodicity of beta?

Yes, there are periodic fluctuations in S(t), I(t), and R(t). This is because of the sinusoidal change in beta itself. When (w = 2\*pi\*365/365), the periodic fluctuations in I(t) should be happening every day. And when (w = 2\*pi\*100/365), the periodic fluctuations in I(t) should happen less often, around every three days.

1. Observe the frequency peak(s) and comment on what you see. Does it make sense physically?

I would say yes, the peaks in the graph make sense physically because they agree with the periodicity of beta. The one-day graph represents a one-day periodicity and the FFT graph represents this with a frequency peak happening at one cycle per day. And the same goes for the three-day periodicity but with a different frequency.

1. Observe the change in the peak frequency. Does it shift to lower or higher values? Discuss your observations.

When using the lower value of (w = 2\*pi\*100/365), it looks like the peak frequency shifts to lower values. The behavior shown is to be expected because a longer periodicity in beta will correspond to slower cycles. Therefore, this gives us lower values for the FFt.