To begin, let's look at the simplest possible model of virulence evolution: an SI model with a classic trade-off between transmission rate and virulence. A quantitative genetics model for virulence evolution is the following:

$$\frac{dS}{dt} = b(S+I) - \beta(v)SI - mS \tag{1}$$

$$\frac{dI}{dt} = \beta(v)SI - (m+v)I \tag{2}$$

$$\frac{dv}{dt} = V\left(\frac{d}{dv}\left(\frac{1}{I}\frac{dI}{dt}\right)\right) = V\left(\frac{\beta_0 hS}{(h+v)^2} - 1\right) \tag{3}$$

$$\beta(v) = \frac{\beta_0 v}{h+v} \tag{4}$$

This model has