$$\frac{\mathrm{d}}{\mathrm{d}t}[I] = b_I \left(\frac{\sigma + [H_i]_\tau^{n_1}}{{K_1}^{n_1} + [H_i]_\tau^{n_1}} \right) \left(\frac{K_2^{n_2}}{{K_2}^{n_2} + [T]_\tau^{n_2}} \right) - d_I \frac{[I]}{1 + f([I] + [A] + [T])} \tag{1}$$

$$\frac{\mathrm{d}}{\mathrm{d}t}[A] = b_A \left(\frac{\sigma + [H_i]_\tau^{n_1}}{{K_1}^{n_1} + [H_i]_\tau^{n_1}} \right) \left(\frac{K_2^{n_2}}{{K_2}^{n_2} + [T]_\tau^{n_2}} \right) - d_A \frac{[A]}{1 + f([I] + [A] + [T])} \tag{2}$$

$$\frac{\mathrm{d}}{\mathrm{d}t}[T] = b_T \left(\frac{\sigma + [H_i]_\tau^{n_1}}{{K_1}^{n_1} + [H_i]_\tau^{n_1}} \right) \left(\frac{K_2^{n_2}}{{K_2}^{n_2} + [T]_\tau^{n_2}} \right) - d_T \frac{[T]}{1 + f([I] + [A] + [T])} \tag{3}$$

$$\frac{\mathrm{d}}{\mathrm{d}t}[H_i] = b_H[I] - \frac{\gamma_H[A][H_i]}{1 + g[A]} + S([H_e] - [H_i]) \tag{4}$$

$$\frac{\mathrm{d}}{\mathrm{d}t}[H_e] = -d_H[H_e] - S([H_e] - [H_i]) + D\nabla[H_e] \tag{5}$$