HW 11

2. $z = \frac{1+2z+3z+4z}{2+3z+4z+5z}$

$2z + 12z^2 = 1 + 9z$

$12z^2 - 7z - 1 = 0$

$\frac{7 \pm \sqrt{49+48}}{24}$

$z = \frac{7+\sqrt{97}}{24}, \quad \frac{7-\sqrt{97}}{24}$

3. Let $\vec{x}(n) = [a(n+3), a(n+2), a(n+1), a(n)]$

$$\vec{x}(n+1) = \begin{bmatrix} f(x_1, x_2, x_3) \\ x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

where $f(x_1, x_2, x_3) = \frac{1+2x_1+3x_2+4x_3}{2+3x_1+4x_2+5x_3}$

4. Steady state

$\frac{r+5+\sqrt{r^2+10r+1}}{12}, \quad \frac{r+5-\sqrt{r^2+10r+1}}{12}$

Cutoff $r_0 = 3.43$

5. $r_1 = 2.1$

$r_2 = 1.9$

$r_3 = 1.885$