기존 SIR

Susceptible (취약자)

$$\frac{dS}{dt} = S_{(t+1)} - S_{(t)} = -\frac{\alpha}{N} S_{(t)} I_{(t)}$$

Infected (감염자)

$$\frac{dI}{dt} = I_{(t+1)} - I_{(t)} = \frac{\alpha}{N} S_{(t)} I_{(t)} - \beta I_{(t)} - \gamma I_{(t)}$$

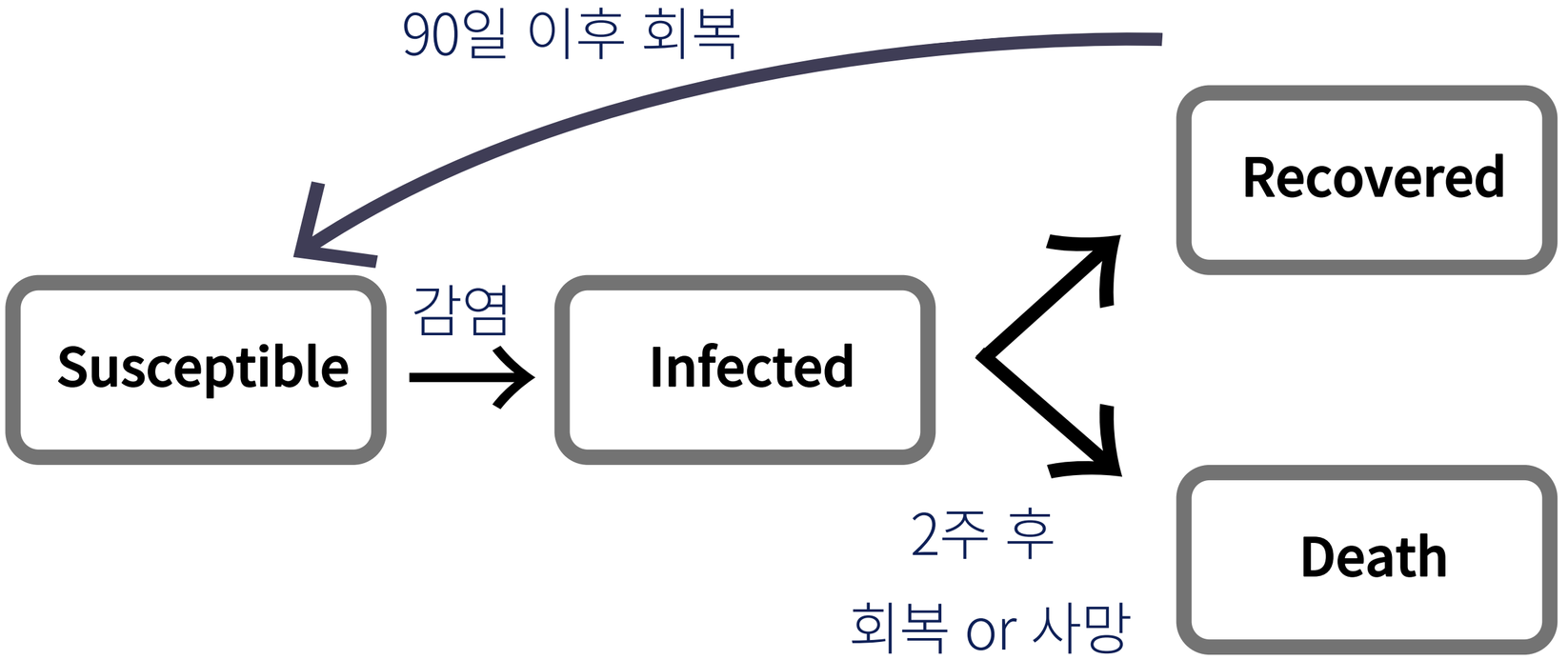
Recovered (회복자)

$$\frac{dR}{dt} = R_{(t+1)} - R_{(t)} = \beta I_{(t)} \qquad \frac{dD}{dt} = D_{(t+1)} - D_{(t)} = \gamma I_{(t)}$$

코로나 SIR

보유중인 값

일일 신규 확진자 수, 누적 확진자 수, 누적 사망자 수



코로나 SIR

Infected (감염자)

$$I_{(t)} = \sum_{i=t-13}^{t} I_{n(i)} = \sum_{i=1}^{t} I_{n(i)} - \sum_{i=1}^{t-14} I_{n(i)}$$

Recovered (회복자)

$$R_{(t)} = \sum_{i=t-103}^{t-14} I_{n(i)} - \sum_{i=1}^{t} D_{n(i)}$$

$$D_{(t)} = \sum_{i=1}^{t} D_{n(i)}$$

$$= \sum_{i=1}^{t-14} I_{n(i)} - \sum_{i=1}^{t-104} I_{n(i)} - D_{(t)}$$

Susceptible (취약자)

$$S_{(t)} = N - \sum_{i=1}^{t} I_{n(i)} + R_{n(t-90)}$$

코로나 SIR

Susceptible (취약자)

$$\begin{aligned}\frac{dS}{dt} &= S_{(t+1)} - S_{(t)} \\ &= -I_{n(t+1)} + R_{n(t-89)} - R_{n(t-90)} \\ &= -\frac{\alpha}{N} S_{(t)} I_{(t)} + R_{n(t-89)} - R_{n(t-90)}\end{aligned}$$

Recovered (회복자)

$$\frac{dR}{dt} = R_{(t+1)} - R_{(t)}$$

$$\begin{aligned}&= \left(\sum_{i=t-102}^{t-13} I_{n(i)} - \sum_{i=1}^{t+1} D_{n(i)} \right) - \left(\sum_{i=t-103}^{t-14} I_{n(i)} - \sum_{i=1}^{t} D_{n(i)} \right) \\ &= I_{n(t-13)} - I_{n(t-103)} - D_{n(t+1)} \\ &= \beta I_{(t)} - \delta I_{(t)}\end{aligned}$$

$$\frac{dD}{dt} = D_{(t+1)} - D_{(t)} = \gamma I_{(t)}$$

Infected (감염자)

$$\begin{aligned}\frac{dI}{dt} &= I_{(t+1)} - I_{(t)} \\ &= \sum_{i=t-12}^{t+1} I_{n(i)} - \sum_{i=t-13}^{t} I_{n(i)} \\ &= I_{n(t+1)} - I_{n(t-13)} \\ &= -\frac{\alpha}{N} S_{(t)} I_{(t)} - (\beta I_{(t)} + \gamma I_{(t)})\end{aligned}$$