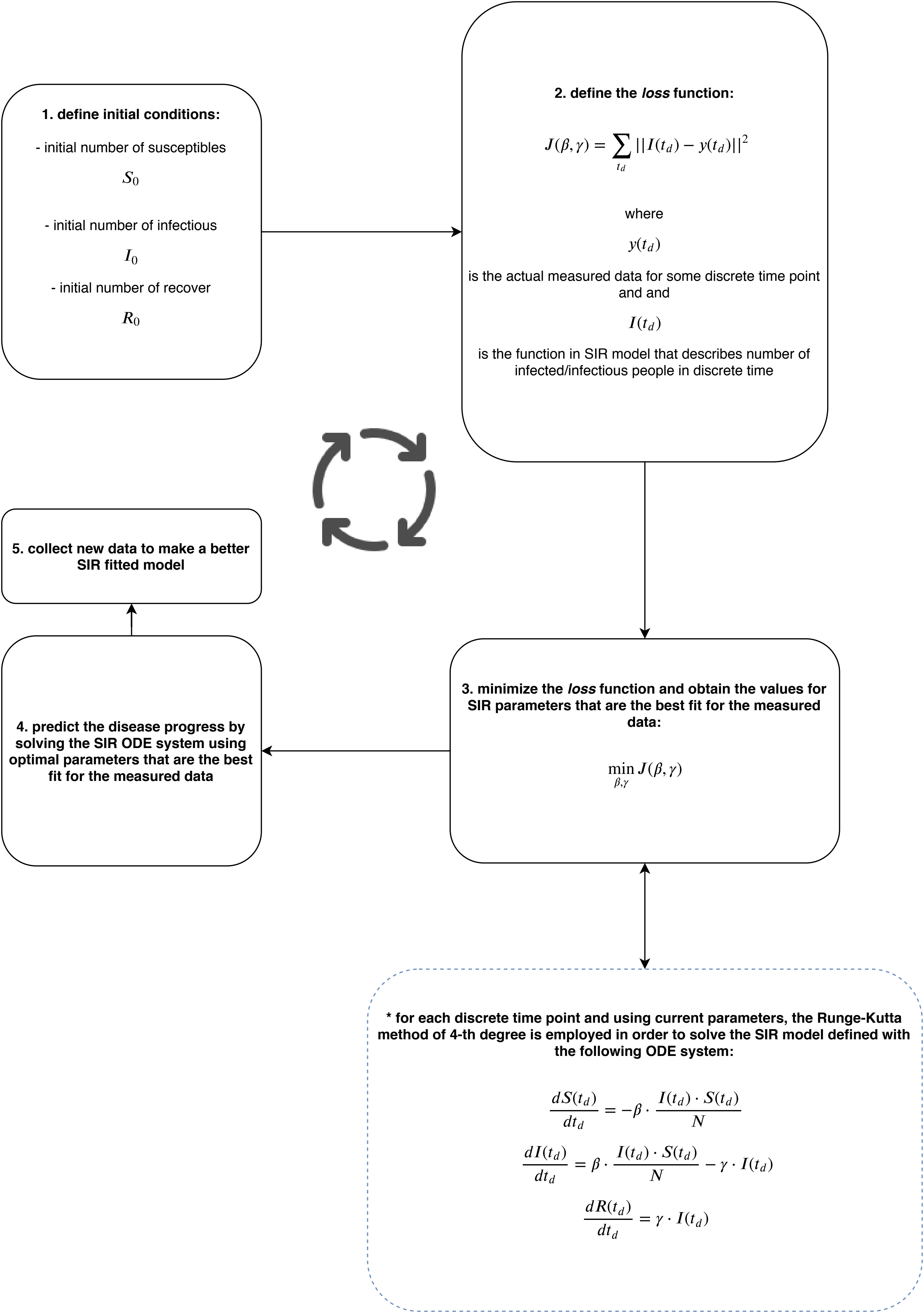
1. define initial conditions:
- initial number of susceptibles
S_0
- initial number of infectious
I_0
- initial number of recover
R_0
2. define the *loss* function:
$J(\beta, \gamma) = \sum_{t_d} ||I(t_d) - y(t_d)||^2$
where
$y(t_d)$
is the actual measured data for some discrete time point and and
$I(t_d)$
is the function in SIR model that describes number of infected/infectious people in discrete time
3. minimize the *loss* function and obtain the values for SIR parameters that are the best fit for the measured data:
$\min_{\beta,\gamma} J(\beta, \gamma)$
4. predict the disease progress by solving the SIR ODE system using optimal parameters that are the best fit for the measured data
5. collect new data to make a better SIR fitted model
* for each discrete time point and using current parameters, the Runge-Kutta method of 4-th degree is employed in order to solve the SIR model defined with the following ODE system:
$\frac{dS(t_d)}{dt_d} = -\beta \cdot \frac{I(t_d) \cdot S(t_d)}{N}$
$\frac{dI(t_d)}{dt_d} = \beta \cdot \frac{I(t_d) \cdot S(t_d)}{N} - \gamma \cdot I(t_d)$
$\frac{dR(t_d)}{dt_d} = \gamma \cdot I(t_d)$