Basic Epidemic Model

In[•]:=
```
Clear[s, t, i, sol]
beta = 2.8 * 10^-3
gamma = 0.44
de1 = s'[t] == -beta * s[t] * i[t]
de2 = i'[t] == beta * s[t] * i[t] - gamma * i[t]
sol = NDSolve[{de1, de2, s[0] == 762, i[0] == 1}, {s[t], i[t]}, {t, 0, 30}]
Plot[Evaluate[{s[t], i[t]} /. sol], {t, 0, 30}, PlotRange → {0, 800}]
```

Out[•]= 0.0028

Out[•]= 0.44

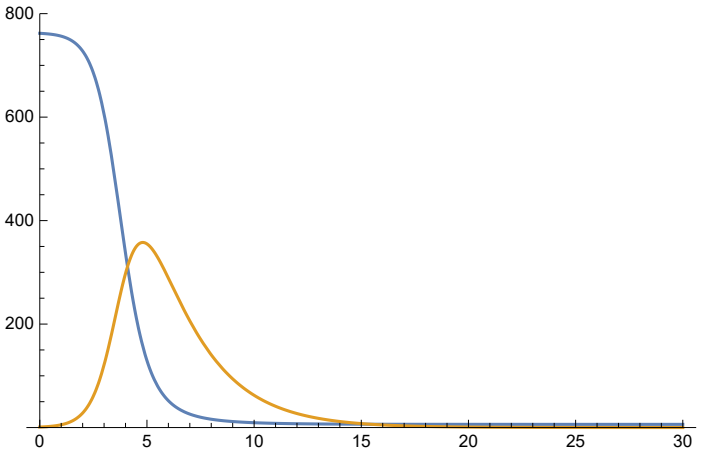
Out[•]= $s'[t] == -0.0028\, i[t]\, s[t]$

Out[•]= $i'[t] == -0.44\, i[t] + 0.0028\, i[t]\, s[t]$

Out[•]= $\{\{s[t] \to \text{InterpolatingFunction}[$ Domain: {{0., 30.}} Output: scalar $][t],$

$i[t] \to \text{InterpolatingFunction}[$ Domain: {{0., 30.}} Output: scalar $][t]\}\}$

Out[•]=



In[•]:=
```
Clear[s, t, i, sol, beta, gamma, de1, de2]
beta = 10^-6
n = 10^6
a = b = 1 / 50
gamma = 1 / 3
de1 = s'[t] == b * n - beta * s[t] * i[t] - a * s[t]
de2 = i'[t] == beta * s[t] * i[t] - gamma * i[t] - a * i[t]
sol = NDSolve[{de1, de2, s[0] == 9 * 10^5, i[0] == 10^5}, {s[t], i[t]}, {t, 0, 150}]
Plot[Evaluate[{i[t]} /. sol], {t, 0, 150}, PlotRange → {0, 4 * 10^5}]
```

Out[•]= $\frac{1}{1\,000\,000}$

Out[•]= 1 000 000

Out[•]= $\frac{1}{50}$

Out[•]= $\frac{1}{3}$

Out[•]= $s'[t] == 20\,000 - \frac{s[t]}{50} - \frac{i[t]\,s[t]}{1\,000\,000}$

Out[•]= $i'[t] == -\frac{53\,i[t]}{150} + \frac{i[t]\,s[t]}{1\,000\,000}$

Out[•]= {{s[t] → InterpolatingFunction[Domain: {{0., 150.}} Output: scalar][t],
i[t] → InterpolatingFunction[Domain: {{0., 150.}} Output: scalar][t]}}

Out[•]=