9. Väestön kasvumalli

```
> restart :
```

```
> N := t→N0·exp(λ·t) + v/λ (exp(λ·t) − 1)
```

$$N := t \rightarrow N0\, e^{\lambda t} + \frac{v\left(e^{\lambda t} - 1\right)}{\lambda} \tag{1.1}$$

```
> N0 := 10^6
```

$$N0 := 1000000 \tag{1.2}$$

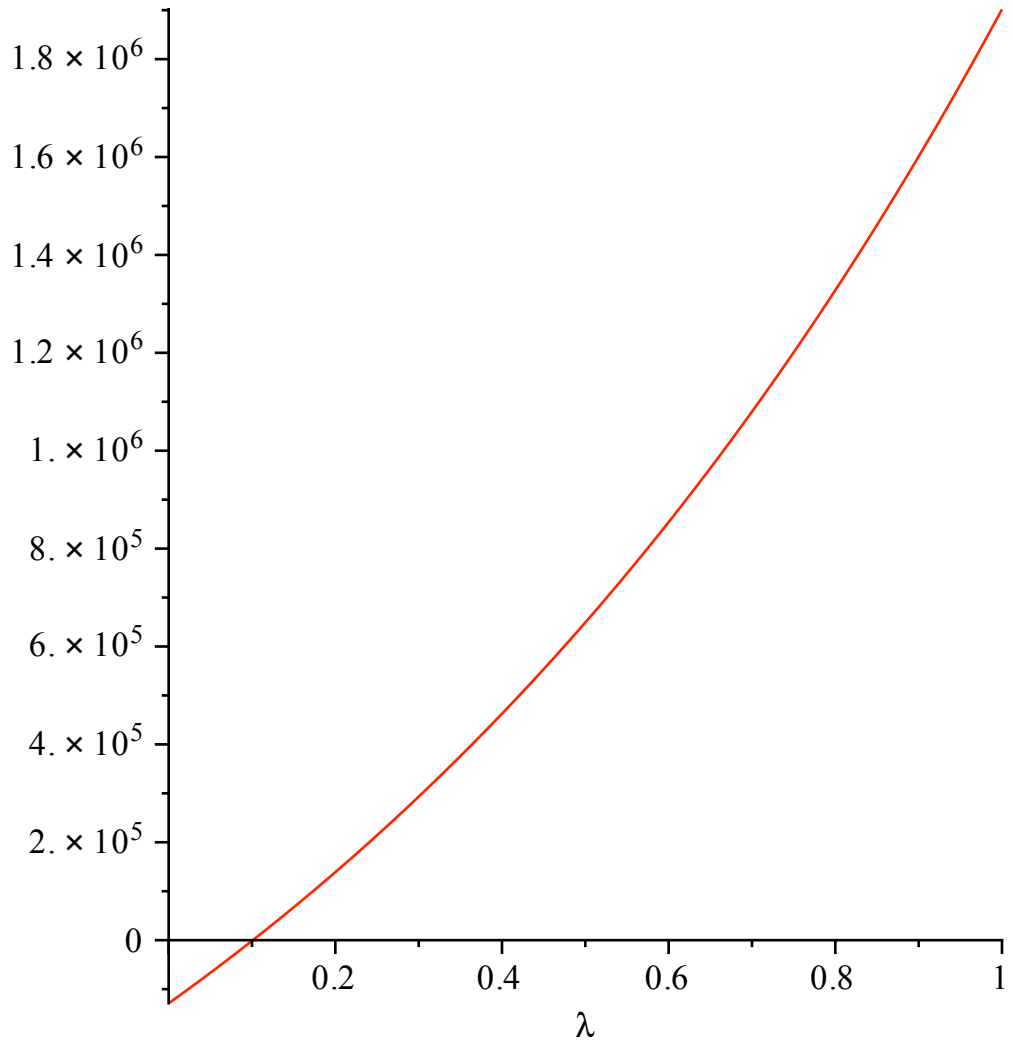
```
> v := 435000
```

$$v := 435000 \tag{1.3}$$

```
> yht := N(1) = 1564000
```

$$yht := 1000000\, e^{\lambda} + \frac{435000\left(e^{\lambda} - 1\right)}{\lambda} = 1564000 \tag{1.4}$$

```
> plot(lhs(yht) − rhs(yht), lambda = 0 ..1)
```



> λ := *fsolve*(*yht*, lambda = 0.1)

$$\lambda := 0.1009979297 \tag{1.5}$$

> $N(t)$

$$5.307018978\ 10^{6}\ e^{0.1009979297\ t} - 4.307018978\ 10^{6} \tag{1.6}$$

> $N(2)$

$$2.187938736\ 10^{6} \tag{1.7}$$