```
A = {{a / t, b / t}, {c, d}}
```

$$\left\{\left\{\frac{a}{t}, \frac{b}{t}\right\}, \{c, d\}\right\}$$

```
Eigenvectors[A]
```

$$\left\{\left\{-\frac{-a+d\,t+\sqrt{a^2+4\,b\,c\,t-2\,a\,d\,t+d^2\,t^2}}{2\,c\,t}, 1\right\}, \left\{-\frac{-a+d\,t-\sqrt{a^2+4\,b\,c\,t-2\,a\,d\,t+d^2\,t^2}}{2\,c\,t}, 1\right\}\right\}$$

```
MatrixForm /@ JordanDecomposition[A]
```

$$\left\{\begin{pmatrix} \frac{a-d\,t-\sqrt{a^2+4\,b\,c\,t-2\,a\,d\,t+d^2\,t^2}}{2\,c\,t} & \frac{a-d\,t+\sqrt{a^2+4\,b\,c\,t-2\,a\,d\,t+d^2\,t^2}}{2\,c\,t} \\ 1 & 1 \end{pmatrix}, \begin{pmatrix} \frac{a+d\,t-\sqrt{a^2+4\,b\,c\,t-2\,a\,d\,t+d^2\,t^2}}{2\,t} & 0 \\ 0 & \frac{a+d\,t+\sqrt{a^2+4\,b\,c\,t-2\,a\,d\,t+d^2\,t^2}}{2\,t} \end{pmatrix}\right\}$$

```
DSolve[x y''[x] + p y'[x] + q y[x] == 0, y[x], x]
```

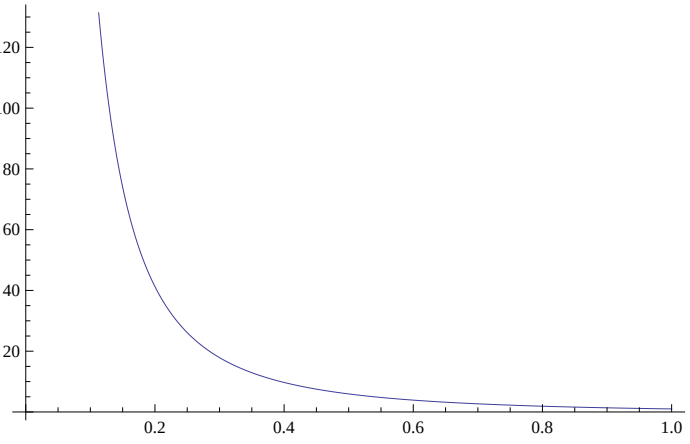
$$\left\{\left\{y[x] \to q^{\frac{1}{2}-\frac{p}{2}}\, x^{\frac{1}{2}-\frac{p}{2}}\, \text{BesselJ}\left[1-p, 2\sqrt{q}\,\sqrt{x}\right]\, C[2]\, \text{Gamma}[2-p] + q^{\frac{1}{2}-\frac{p}{2}}\, x^{\frac{1}{2}-\frac{p}{2}}\, \text{BesselJ}\left[-1+p, 2\sqrt{q}\,\sqrt{x}\right]\, C[1]\, \text{Gamma}[p]\right\}\right\}$$

In[1]:=
```
DSolve[x y'[x] + (E^x + E^-x) y[x] == 0, y[x], x]
```

Out[1]=
$$\left\{\left\{y[x] \to e^{-\text{ExpIntegralEi}[-x]-\text{ExpIntegralEi}[x]}\, C[1]\right\}\right\}$$

In[10]:=
```
Sol = NDSolve[
   x y'[x] + (E^x + E^-x) y[x] == 0 && y[1] == 1,
   y[x], {x, ϵ = 10^-9, 1}
  ];
Plot[Evaluate[y[x] /. Sol], {x, ϵ, 1}, PlotPoints → 1000]
```

Out[11]=



In[12]:=
```
Plot[Evaluate[(y[x])^(-1/2) /. Sol], {x, ϵ, 1}, PlotPoints → 1000]
```

Out[12]=