

Antonius' Handbook - Computational Notebook:

~~~~~  
Differential Equations:  
~~~~~

$$\text{DSolve}[y''[x] + A/x y[x] == 0, y[x], x]$$

$$\left\{ \left\{ y[x] \rightarrow \sqrt{A} \sqrt{x} \text{BesselJ} \left[1, 2\sqrt{A} \sqrt{x} \right] C[1] + 2i \sqrt{A} \sqrt{x} \text{BesselY} \left[1, 2\sqrt{A} \sqrt{x} \right] C[2] \right\} \right\}$$

$$\text{DSolve}[y''[x] - A/x y[x] == 0, y[x], x]$$

$$\left\{ \left\{ y[x] \rightarrow -\sqrt{A} \sqrt{x} \text{BesselI} \left[1, 2\sqrt{A} \sqrt{x} \right] C[1] + 2\sqrt{A} \sqrt{x} \text{BesselK} \left[1, 2\sqrt{A} \sqrt{x} \right] C[2] \right\} \right\}$$

$$\text{DSolve}[y''[x] + A/x y'[x] == 0, y[x], x]$$

$$\left\{ \left\{ y[x] \rightarrow \frac{x^{1-A} C[1]}{1-A} + C[2] \right\} \right\}$$

$$\text{DSolve}[y''[x] - A/x y'[x] == 0, y[x], x]$$

$$\left\{ \left\{ y[x] \rightarrow \frac{x^{1+A} C[1]}{1+A} + C[2] \right\} \right\}$$

$$\text{DSolve}[y''[x] + A/x^n y'[x] == 0, y[x], x]$$

$$\left\{ \left\{ y[x] \rightarrow C[2] + \frac{x \left(-\frac{A x^{1-n}}{-1+n} \right)^{-\frac{1}{1+n}} C[1] \text{Gamma} \left[\frac{1}{1-n}, -\frac{A x^{1-n}}{-1+n} \right]}{-1+n} \right\} \right\}$$