

LaplaceTransform[$x[t]$, t , s] -> $X[s]$ /.

LaplaceTransform[$y[t]$, t , s] -> $Y[s]$

$$sX[s] + Y[s] == \frac{2}{s^3}$$

$X1[s] = X[s]$ /.

Simplify[**Solve**[{**Lapleqn1**, **Lapleqn2**}, { $X[s]$, $Y[s]$ }][[1]]]

$$\frac{1}{-s^2 + s^4}$$

$Y1[s] = Y[s]$ /.

Simplify[**Solve**[{**Lapleqn1**, **Lapleqn2**}, { $X[s]$, $Y1[s]$ }][[1]]]

$$\frac{-2 + s^2}{s^3(-1 + s^2)}$$

$x[t.] = \text{InverseLaplaceTransform}[X1[s], s, t]$

$$-\frac{E^{-t}}{2} + \frac{E^t}{2} - t$$

$y[t.] = \text{InverseLaplaceTransform}[Y1[s], s, t]$

$$1 - \frac{E^{-t}}{2} - \frac{E^t}{2} + t^2$$

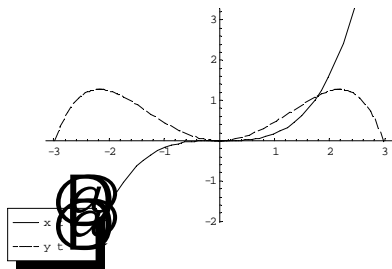
Needs["Graphics`Legend`"];

Plot[{ $x[t]$, $y[t]$ }, { t , -3, 3},

PlotStyle -> {{**GrayLevel**[0]}, {**Dashing**[{0.03, 0.01}]}},

PlotLegend -> {" $x[t]$ ", " $y[t]$ "},

LegendSize -> {0.5, 0.3};

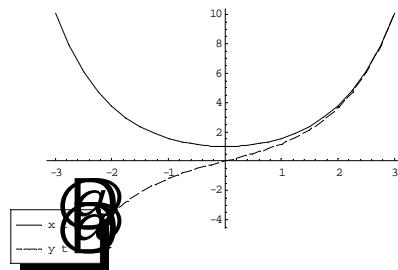


□

PlotStyle -> {{**GrayLevel**[0]}, {**Dashing**[{0.03, 0.01}]}},

PlotLegend -> {" $x[t]$ ", " $y[t]$ "},

LegendSize -> {0.5, 0.3};



□

5.5.3 Laplace

$$\begin{cases} x + Dy = t \\ Dx + y = t^2 \\ x(0) = 0, \quad y(0) = 0 \end{cases}$$

() **Needs**["Calculus`LaplaceTransform`"];

Clear[x , y , X , Y];

$eqn1 = x[t] + y'[t] == t$;

$eqn2 = x'[t] + y[t] == t^2$;

Lapleqn1 = **LaplaceTransform**[$eqn1$, t , s] /. $y[0] -> 0$ /.

LaplaceTransform[$x[t]$, t , s] -> $X[s]$ /.

LaplaceTransform[$y[t]$, t , s] -> $Y[s]$

$$X[s] + sY[s] == \frac{1}{s^2}$$

Lapleqn2 = **LaplaceTransform**[$eqn2$, t , s] /. $x[0] -> 0$ /.