電腦在工程數學應用-作業七 (Laplace Transform)

```
<< Calculus‘LaplaceTransform‘
```

HW1: Find Laplace transform of 1.

```
<< Integrate[Exp[-s t], {t,0, Infinity}]
<< LaplaceTransform[1,t,s]

<< Integrate[Exp[a t] Exp[-s t], {t,0, Infinity}]
<< LaplaceTransform[Exp[a t], t, s]
```

HW2: Find Laplace transform of t.

```
<< Integrate[t Exp[-s t], {t,0, Infinity}
<< LaplaceTransform[t, t, s]
```

HW3: Solve the following ODE by Laplace transform:

$$\ddot{x}(t)+\omega^2 x(t) = cos(\bar{\omega}t), if\ \bar{\omega} \neq \omega,\ or\ \bar{\omega} = \omega$$

HW4: Solve the following ODE by Laplace transform:

$$\ddot{x}(t)+\omega^2 x(t) = sin(\bar{\omega}t), if\ \bar{\omega} \neq \omega,\ or\ \bar{\omega} = \omega$$

HW5: Find Inverse Laplace Transform of $s/(s^2+64)$.

```
<< InverseLaplaceTransform[s/(s^2+64), s, t]
```

HW6: Find Inverse Laplace Transform of $s/(s^4-64)$.

```
<< InverseLaplaceTransform[s/(s^4 - 64), s, t]
```

HW7: Find $\mathcal{L}^{-1}\{dF(s)/ds\}$.

```
<< InverseLaplaceTransform[D[LaplaceTransform[f[t]],t,s],s],s,t]
```

HW8: Find Laplace transform for Heaviside function $\mathcal{L}\{H(t-a)\}$.

```
<< Transform[UnitStep[t-a],t,s]
```

HW9: Find the solution by Laplace transform

$$y''(t) - 5y'(t) + 6y(t) = e^{2t}$$

subjected to

$$y(0) = 1, y'(0) = -2$$