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(*Problem:  $x''[t] + w^2 x[t] = 0$ ,
using laplace transform. The initial conditions are  $x[0]=1, x'[0]=0$ *)
deq = x''[t] + w^2 * x[t] == 0;
initial = {x[0] -> 1, x'[0] -> 0};
? LaplaceTransform
```

LaplaceTransform[*expr*, *t*, *s*] gives the Laplace transform of *expr*.
LaplaceTransform[*expr*, {*t*₁, *t*₂, ...}, {*s*₁, *s*₂, ...}] gives the multidimensional Laplace transform of *expr*. >>

```
aeq = LaplaceTransform[deq, t, s] /. initial
fs = Solve[aeq, LaplaceTransform[x[t], t, s]]
fs = LaplaceTransform[x[t], t, s] /. fs[[1]] /. w -> 1
? InverseLaplaceTransform
```

InverseLaplaceTransform[*expr*, *s*, *t*] gives the inverse Laplace transform of *expr*.
InverseLaplaceTransform[*expr*, {*s*₁, *s*₂, ...}, {*t*₁, *t*₂, ...}] gives the multidimensional inverse Laplace transform of *expr*. >>

```
xt = InverseLaplaceTransform[fs, s, t]
Plot[xt, {t, 0, 10}]
```