

## 14.5 Laplaceova transformácia

**Príklad** Nájdite Laplaceov obraz  $F(s)$  funkcie  $f(t) = te^t \cos t + \frac{e^t - e^{-t}}{t}$ .

*Riešenie.*

a) Zadanie v MATLABe s využitím funkcií MAPLU

```
>> maple('with(inttrans);')
```

```
ans =
```

```
[addtable, fourier, fouriercos, fouriersin, hankel, hilbert, invfourier, invhilbert, invlaplace, invmellin, laplace, mellin, savetable]
```

```
>> maple('laplace(t*exp(t)*cos(t)+(exp(t)-exp(-t))/t, t, s)')
```

*Výsledok*

```
ans =
```

```
-1/((s-1)^2+1)+2*(s-1)^2/((s-1)^2+1)^2-log(s-1)+log(s+1)
```

b) Zadanie v MATLABe bez použitia MAPLU

```
>> syms s t F real
```

```
>> F=laplace(t*exp(t)*cos(t)+(exp(t)-exp(-t))/t)
```

```
F =
```

```
-1/((s-1)^2+1)+2*(s-1)^2/((s-1)^2+1)^2-log(s-1)+log(s+1)
```

(Môžeme ho upraviť do tvaru  $F(s) = \frac{-1}{(s-1)^2 + 1} + \frac{2(s-1)^2}{((s-1)^2 + 1)^2} + \ln \frac{s+1}{s-1}$ ).

**Príklad** Nájdite predmet  $f(t)$ , ak jeho Laplaceov obraz je  $F(s) = \frac{s^2 + 2s - 1}{s^3 + 3s^2 + 3s + 1}$ .

*Riešenie.*

a) Zadanie v MATLABe s použitím MAPLU je:

```
>> maple('invlaplace((s^2+2*s-1)/(s^3+3*s^2+3*s+1), s, t)')
```

*Výsledok*

```
ans =
```

```
-t^2*exp(-t)+exp(-t)
```

b) Zadanie v MATLABe bez použitia MAPLU je:

```
>> syms s t f real
```

```
>> f=ilaplace((s^2+2*s-1)/(s^3+3*s^2+3*s+1), s, t)
```

```
f =
```

```
-t^2*exp(-t)+exp(-t)
```