```
> restart :
> LaplaceFunction := s/(s^2+4)^2;
```

$$LaplaceFunction := \frac{s}{(s^2+4)^2} \tag{1}$$

```
> with(inttrans) :
> OriginalFunction := invlaplace(LaplaceFunction, s, t);
```

$$OriginalFunction := \frac{1}{4}\, t \sin(2\,t) \tag{2}$$

```
> FirstFunction := s/(s^2+4); SecondFunction := 2/(s^2+4);
```

$$FirstFunction := \frac{s}{s^2+4}$$

$$SecondFunction := \frac{2}{s^2+4} \tag{3}$$

```
> FunctionOne := invlaplace(FirstFunction, s, t);
```

$$FunctionOne := \cos(2\,t) \tag{4}$$

```
> FunctionTwo := invlaplace(SecondFunction, s, t);
```

$$FunctionTwo := \sin(2\,t) \tag{5}$$

```
> FunctionWeLookFor := 1/2 · int(cos(2·tau)·sin(2·t-2·tau), tau=0..t);
```

$$FunctionWeLookFor := \frac{1}{4}\, t \sin(2\,t) \tag{6}$$

```
> AA := array([[2,3],[1,4]]);
```

$$AA := \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix} \tag{7}$$

```
> with(linalg) :
> MatExp := exponential(AA, t);
```

$$MatExp := \begin{bmatrix} \frac{3}{4}\,e^{t} + \frac{1}{4}\,e^{5\,t} & \frac{3}{4}\,e^{5\,t} - \frac{3}{4}\,e^{t} \\ \frac{1}{4}\,e^{5\,t} - \frac{1}{4}\,e^{t} & \frac{1}{4}\,e^{t} + \frac{3}{4}\,e^{5\,t} \end{bmatrix} \tag{8}$$

```
> Ident := array([[1,0],[0,1]]);
```

$$Ident := \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \tag{9}$$

```
> sIminusA := evalm(s·Ident - AA);
```

$$sIminusA := \begin{bmatrix} s-2 & -3 \\ -1 & s-4 \end{bmatrix} \tag{10}$$

```
> InvsIminusA := inverse(sIminusA);
```

$$InvsIminusA := \begin{bmatrix} \frac{s-4}{s^2-6s+5} & \frac{3}{s^2-6s+5} \\ \frac{1}{s^2-6s+5} & \frac{s-2}{s^2-6s+5} \end{bmatrix} \quad (11)$$

```
> ExpMat := map(convert, map(invlaplace, InvsIminusA, s, t), exp);
```

$$ExpMat := \begin{bmatrix} \frac{3}{4}e^{t} + \frac{1}{4}e^{5t} & \frac{3}{4}e^{5t} - \frac{3}{4}e^{t} \\ \frac{1}{4}e^{5t} - \frac{1}{4}e^{t} & \frac{1}{4}e^{t} + \frac{3}{4}e^{5t} \end{bmatrix} \quad (12)$$

```
>
```