```
> restart
> AA := array([[-1, 0, 1], [1, 1, 0], [-1, -1, 1]])
```

$$AA := \begin{bmatrix} -1 & 0 & 1 \\ 1 & 1 & 0 \\ -1 & -1 & 1 \end{bmatrix} \tag{1}$$

```
> with(linalg) :
> MatExp := exponential(AA, t) : evalf(MatExp[1, 1], 2); evalf(MatExp[1, 2], 2); evalf(MatExp[1, 3],
      2); evalf(MatExp[2, 1], 2); evalf(MatExp[2, 2], 2); evalf(MatExp[2, 3], 2); evalf(MatExp[3, 1],
      2); evalf(MatExp[3, 2], 2); evalf(MatExp[3, 3], 2)
```

$$0.024\, e^{0.85t}\cos(-0.71\,t) + 0.019\, e^{0.85t}\cos(0.71\,t) - 0.21\, e^{0.85t}\sin(0.71\,t) + 0.22\, e^{0.85t}\sin(-0.71\,t) + 1.0\, e^{-0.78t} + 1.\,I\,(-0.22\, e^{0.85t}\cos(-0.71\,t) + 0.21\, e^{0.85t}\cos(0.71\,t) + 0.019\, e^{0.85t}\sin(0.71\,t) + 0.021\, e^{0.85t}\sin(-0.71\,t) + 0.01\, e^{-0.78t})$$

$$0.35\, e^{0.85t}\sin(-0.71\,t) + 0.15\, e^{0.85t}\cos(-0.71\,t) - 0.34\, e^{0.85t}\sin(0.71\,t) + 0.15\, e^{0.85t}\cos(0.71\,t) - 0.31\, e^{-0.78t} + 1.\,I\,(-0.35\, e^{0.85t}\cos(-0.71\,t) + 0.15\, e^{0.85t}\sin(-0.71\,t) + 0.34\, e^{0.85t}\cos(0.71\,t) + 0.15\, e^{0.85t}\sin(0.71\,t))$$

$$0.070\, e^{0.85t}\sin(0.71\,t) - 0.075\, e^{0.85t}\sin(-0.71\,t) + 0.28\, e^{0.85t}\cos(0.71\,t) - 0.56\, e^{-0.78t} + 0.29\, e^{0.85t}\cos(-0.71\,t) + 1.\,I\,(-0.070\, e^{0.85t}\cos(0.71\,t) + 0.075\, e^{0.85t}\cos(-0.71\,t) + 0.28\, e^{0.85t}\sin(0.71\,t) + 0.29\, e^{0.85t}\sin(-0.71\,t) - 0.01\, e^{-0.78t})$$

$$0.070\, e^{0.85t}\sin(0.71\,t) - 0.075\, e^{0.85t}\sin(-0.71\,t) + 0.28\, e^{0.85t}\cos(0.71\,t) - 0.56\, e^{-0.78t} + 0.29\, e^{0.85t}\cos(-0.71\,t) + 1.\,I\,(-0.070\, e^{0.85t}\cos(0.71\,t) + 0.075\, e^{0.85t}\cos(-0.71\,t) + 0.28\, e^{0.85t}\sin(0.71\,t) + 0.29\, e^{0.85t}\sin(-0.71\,t) - 0.01\, e^{-0.78t})$$

$$0.40\, e^{0.85t}\cos(0.71\,t) + 0.43\, e^{0.85t}\cos(-0.71\,t) + 0.16\, e^{-0.78t} + 0.28\, e^{0.85t}\sin(0.71\,t) - 0.28\, e^{0.85t}\sin(-0.71\,t) + 1.\,I\,(0.40\, e^{0.85t}\sin(0.71\,t) + 0.43\, e^{0.85t}\sin(-0.71\,t) - 0.28\, e^{0.85t}\cos(0.71\,t) + 0.28\, e^{0.85t}\cos(-0.71\,t) - 0.002\, e^{-0.78t})$$

$$-0.35\, e^{0.85t}\sin(-0.71\,t) - 0.15\, e^{0.85t}\cos(-0.71\,t) + 0.34\, e^{0.85t}\sin(0.71\,t) - 0.15\, e^{0.85t}\cos(0.71\,t) + 0.31\, e^{-0.78t} + 1.\,I\,(0.35\, e^{0.85t}\cos(-0.71\,t) - 0.15\, e^{0.85t}\sin(-0.71\,t) - 0.34\, e^{0.85t}\cos(0.71\,t) - 0.15\, e^{0.85t}\sin(0.71\,t))$$

$$-0.42\, e^{0.85t}\sin(0.71\,t) + 0.40\, e^{0.85t}\sin(-0.71\,t) - 0.14\, e^{0.85t}\cos(-0.71\,t) - 0.13\, e^{0.85t}\cos(0.71\,t) + 0.23\, e^{-0.78t} + 1.\,I\,(0.42\, e^{0.85t}\cos(0.71\,t) - 0.40\, e^{0.85t}\cos(-0.71\,t) - 0.14\, e^{0.85t}\sin(-0.71\,t) - 0.13\, e^{0.85t}\sin(0.71\,t) - 0.004\, e^{-0.78t})$$

$$-0.77\, e^{0.85t}\sin(0.71\,t) + 0.76\, e^{0.85t}\sin(-0.71\,t) + 0.04\, e^{0.85t}\cos(0.71\,t) - 0.059\, e^{-0.78t} + 0.02\, e^{0.85t}\cos(-0.71\,t) + 1.\,I\,(0.77\, e^{0.85t}\cos(0.71\,t) - 0.76\, e^{0.85t}\cos(-0.71\,t) + 0.04\, e^{0.85t}\sin(0.71\,t) + 0.02\, e^{0.85t}\sin(-0.71\,t) - 0.001\, e^{-0.78t})$$

$$0.58\, e^{0.85t}\cos(-0.71\,t) + 0.58\, e^{0.85t}\cos(0.71\,t) - 0.05\, e^{0.85t}\sin(0.71\,t) + 0.05\, e^{0.85t}\sin(-0.71\,t) - 0.13\, e^{-0.78t} + 1.\,I\,(0.58\, e^{0.85t}\sin(0.71\,t) + 0.58\, e^{0.85t}\sin(-0.71\,t) + 0.05\, e^{0.85t}\cos(0.71\,t) - 0.05\, e^{0.85t}\cos(-0.71\,t)) \tag{2}$$

```
> Comprobacion[1] := simplify(evalm( map(diff, MatExp, t) - evalm( AA &* MatExp) ) )
```

$$Comprobacion_1 := \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} \quad (3)$$

```
> Identidad := simplify(map(rcurry(eval, t ='0'), MatExp) )
```

$$Identidad := \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad (4)$$

```
> MatOriginal := simplify(map(rcurry(eval, t ='0'), map(diff, MatExp, t) ) )
```

$$MatOriginal := \begin{bmatrix} -1 & 0 & 1 \\ 1 & 1 & 0 \\ -1 & -1 & 1 \end{bmatrix} \quad (5)$$

```
>
```