```
> restart :
> with(DifferentialGeometry) :
> with(Tools) :
> DGsetup( [z, y, u[1], u[2]], M, verbose);
```

The following coordinates have been protected:

$$[z, y, u_1, u_2]$$

The following vector fields have been defined and protected:

$$[D\_z, D\_y, D\_u_1, D\_u_2]$$

The following differential 1-forms have been defined and protected:

$$[dz, dy, du_1, du_2]$$

frame name: M **(1)**

```
M > L := evalDG(D_z + I·y· D_u[1] + I·(2·z·y + y^2)·D_u[2]);
```

$$L := D\_z + \mathrm{I}\, y\, D\_u_1 + \mathrm{I}\, y\, (2\, z + y)\, D\_u_2 \quad \textbf{(2)}$$

```
M > L# := evalDG(D_y - I·z· D_u[1] - I·(2·z·y + z^2)·D_u[2]);
```

$$L^{\#} := D\_y - \mathrm{I}\, z\, D\_u_1 - \mathrm{I}\, z\, (2\, y + z)\, D\_u_2 \quad \textbf{(3)}$$

```
M > T := I·LieBracket(L, L#);
```

$$T := \mathrm{I}\, (-2\, \mathrm{I}\, D\_u_1 + (-4\, \mathrm{I}\, z - 4\, \mathrm{I}\, y)\, D\_u_2) \quad \textbf{(4)}$$

```
M > S := LieBracket(L, T);
```

$$S := 4\, D\_u_2 \quad \textbf{(5)}$$

```
M > LieBracket(L#, T);
```

$$4\, D\_u_2 \quad \textbf{(6)}$$

```
M > Fr := FrameData([S, T, L, L#], N);
```

$$Fr := [[E2, E3] = -E1, [E2, E4] = -E1, [E3, E4] = -\mathrm{I}\, E2] \quad \textbf{(7)}$$

```
M > DGsetup(Fr, [E], [sigma[0], rho[0], zeta[0], zeta#[0]], verbose);
```

The following coordinates have been protected:

$$[z, y, u_1, u_2]$$

The following vector fields have been defined and protected:

$$[E1, E2, E3, E4]$$

The following differential 1-forms have been defined and protected:

$$[\sigma_0, \rho_0, \zeta_0, \zeta^{\#}{}_0]$$

frame name: N **(8)**

```
N > ExteriorDerivative(sigma[0]);
```

$$\rho_0 \wedge \zeta_0 + \rho_0 \wedge \zeta^{\#}{}_0 \quad \textbf{(9)}$$

```
N > ExteriorDerivative(rho[0]);
```

$$\mathrm{I}\, \zeta_0 \wedge \zeta^{\#}{}_0 \quad \textbf{(10)}$$

```
N > ExteriorDerivative(zeta[0]);
```

$$0\, \sigma_0 \wedge \rho_0 \quad \textbf{(11)}$$

```
N > DGinfo("CurrentFrame");
```

$$N \tag{12}$$

```
N > ChangeFrame(M);
```

$$N \tag{13}$$

```
M > DualBasis([S, T, L, L#]);
```

$$\left[\frac{1}{4}\,\mathrm{I}y^2\,dz - \frac{1}{4}\,\mathrm{I}z^2\,dy + \left(-\frac{1}{2}\,z - \frac{1}{2}\,y\right)du_1 + \frac{1}{4}\,du_2,\ -\frac{1}{2}\,\mathrm{I}y\,dz + \frac{1}{2}\,\mathrm{I}z\,dy + \frac{1}{2}\,du_1,\ dz,\ dy\right] \tag{14}$$

```
M >
```