```
Exit[];

PrependTo[$Path, "D:\\Users\\Johannes\\Promotion\\Mathematica\\Packages"]; << JoFin`

MatrixForm /@ MM2[{1, 2, 3}, {{5, 2, 3, 4, 5}, {4, 2, 3, 4, 5}, {3, 2, 3, 4, 5}}]
```

$$\left\{\begin{pmatrix} r\,S[1] \\ r\,S[2] \\ 1 \\ 2 \\ 3 \end{pmatrix}, \begin{pmatrix} S[1]\,\sigma[1] & 0 & 0 & 0 & 0 \\ 0 & S[2]\,\sigma[2] & 0 & 0 & 0 \\ 5 & 2 & 3 & 4 & 5 \\ 4 & 2 & 3 & 4 & 5 \\ 3 & 2 & 3 & 4 & 5 \end{pmatrix}, \begin{pmatrix} 1 & \rho[1,2] & 0 & 0 & 0 \\ \rho[1,2] & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}\right\}$$

```
GFK[V, S, MM2[{1, 2, 3}, {{5, 2, 3, 4, 5}, {4, 2, 3, 4, 5}, {3, 2, 3, 4, 5}}]]
```

$$\begin{aligned}
&3\,V^{(0,0,0,0,0,1)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&2\,V^{(0,0,0,0,1,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&V^{(0,0,0,1,0,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&r\,S[2]\,V^{(0,0,1,0,0,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&r\,S[1]\,V^{(0,1,0,0,0,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\frac{1}{2}\,\Big(63\,V^{(0,0,0,0,0,2)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 12\,\rho[1,2]\,V^{(0,0,0,0,0,2)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 132\,V^{(0,0,0,0,1,1)}[t, S[1], S[2], S[3], S[4], S[5]] + 28\,\rho[1,2]\,V^{(0,0,0,0,1,1)}[t, S[1], \\
&\qquad S[2], S[3], S[4], S[5]] + 70\,V^{(0,0,0,0,2,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 16\,\rho[1,2]\,V^{(0,0,0,0,2,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 138\,V^{(0,0,0,1,0,1)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 32\,\rho[1,2]\,V^{(0,0,0,1,0,1)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 148\,V^{(0,0,0,1,1,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 36\,\rho[1,2]\,V^{(0,0,0,1,1,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 79\,V^{(0,0,0,2,0,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 20\,\rho[1,2]\,V^{(0,0,0,2,0,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 4\,S[2]\,\sigma[2]\,V^{(0,0,1,0,0,1)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 6\,S[2]\,\rho[1,2]\,\sigma[2]\,V^{(0,0,1,0,0,1)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 4\,S[2]\,\sigma[2]\,V^{(0,0,1,0,1,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 8\,S[2]\,\rho[1,2]\,\sigma[2]\,V^{(0,0,1,0,1,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 4\,S[2]\,\sigma[2]\,V^{(0,0,1,1,0,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 10\,S[2]\,\rho[1,2]\,\sigma[2]\,V^{(0,0,1,1,0,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad S[2]^2\,\sigma[2]^2\,V^{(0,0,2,0,0,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 6\,S[1]\,\sigma[1]\,V^{(0,1,0,0,0,1)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 4\,S[1]\,\rho[1,2]\,\sigma[1]\,V^{(0,1,0,0,0,1)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 8\,S[1]\,\sigma[1]\,V^{(0,1,0,0,1,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 4\,S[1]\,\rho[1,2]\,\sigma[1]\,V^{(0,1,0,0,1,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 10\,S[1]\,\sigma[1]\,V^{(0,1,0,1,0,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 4\,S[1]\,\rho[1,2]\,\sigma[1]\,V^{(0,1,0,1,0,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad 2\,S[1]\,S[2]\,\rho[1,2]\,\sigma[1]\,\sigma[2]\,V^{(0,1,1,0,0,0)}[t, S[1], S[2], S[3], S[4], S[5]] + \\
&\quad S[1]^2\,\sigma[1]^2\,V^{(0,2,0,0,0,0)}[t, S[1], S[2], S[3], S[4], S[5]]\Big) + \\
&V^{(1,0,0,0,0,0)}[t, S[1], S[2], S[3], S[4], S[5]]
\end{aligned}$$

```
Length[{{r S[1], r S[2], 1, 2, 3}, {{S[1] σ[1], 0, 0, 0, 0}, {0, S[2] σ[2], 0, 0, 0},
    {5, 2, 3, 4, 5}, {4, 2, 3, 4, 5}, {3, 2, 3, 4, 5}}, {{1, ρ[1, 2], 0, 0, 0},
    {ρ[1, 2], 1, 0, 0, 0}, {0, 0, 1, 0, 0}, {0, 0, 0, 1, 0}, {0, 0, 0, 0, 1}}}[[1]]]
```

5

```
D[#, t] +
Sum[D[#, S[i] ] MM[[1, i]], {i, Length[MM[[1]]]}] +
1 / 2 Sum[D[#, S[i] , S[j]] MM[[2, i, k]] MM[[2, j, m]] MM[[3, k, m]],
{m, Length[MM[[1]]]},
    {k, Length[MM[[1]]]}, {j, Length[MM[[1]]]}, {i, Length[MM[[1]]]}] &
```

$$\partial_t \#1 + \sum_{i}^{\text{Length}[MM[\![1]\!]]} \partial_{S[i]} \#1 \; MM[\![1, i]\!] + \frac{1}{2} \sum_{m}^{\text{Length}[MM[\![1]\!]]} \sum_{k}^{\text{Length}[MM[\![1]\!]]} \sum_{j}^{\text{Length}[MM[\![1]\!]]} \sum_{i}^{\text{Length}[MM[\![1]\!]]} \partial_{S[i],S[j]} \#1 \; MM[\![2, i, k]\!] \; MM[\![2, j, m]\!] \; MM[\![3, k, m]\!] \&$$