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[> restart:
[> with(OreModules):
[> with(linalg):
[>
[> A:=DefineOreAlgebra(diff=[dx,x],diff=[dy,y],polynom=[x,y],comm=
[nu]):
[>
[> R:=evalm([[-nu*(dx^2+dy^2),0,dx],[0,-nu*(dx^2+dy^2),dy],[dx,dy,0]]
);


$$R := \begin{bmatrix} -v(dx^2+dy^2) & 0 & dx \\ 0 & -v(dx^2+dy^2) & dy \\ dx & dy & 0 \end{bmatrix} \quad (1)$$


[> SyzygyModule(R,A);
INJ(3) (2)

[> OreRank(R,A);
0 (3)

[> DimensionRat(R,A);
1 (4)

[> R_adj:=Involution(R,A);


$$R\_adj := \begin{bmatrix} -v dx^2 - v dy^2 & 0 & -dx \\ 0 & -v dx^2 - v dy^2 & -dy \\ -dx & -dy & 0 \end{bmatrix} \quad (5)$$


[> Ext1:=Exti(R_adj,A,1);


$$Ext1 := \left[ \begin{bmatrix} dx^4 + 2 dy^2 dx^2 + dy^4 & 0 & 0 \\ 0 & dx^4 + 2 dy^2 dx^2 + dy^4 & 0 \\ 0 & 0 & dx^2 + dy^2 \end{bmatrix}, \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}, SURJ(3) \right] \quad (6)$$


[> map(factor,Ext1[1]);


$$\begin{bmatrix} (dx^2+dy^2)^2 & 0 & 0 \\ 0 & (dx^2+dy^2)^2 & 0 \\ 0 & 0 & dx^2+dy^2 \end{bmatrix} \quad (7)$$


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