Ball Joints (moving axis)

$$\mathrm{d}\boldsymbol{p} = [\mathrm{d}\boldsymbol{r}]\cdot e^{[\boldsymbol{r}]}\cdot\boldsymbol{x} = [\mathrm{d}\boldsymbol{r}]\cdot\boldsymbol{p} = \underbrace{-[\boldsymbol{p}]}\cdot\mathrm{d}\boldsymbol{r}$$

That is the Jacobian for this joint

$$[\boldsymbol{r}] = \begin{bmatrix} 0 & -r_3 & r_2 \\ r_3 & 0 & -r_1 \\ -r_2 & r_1 & 0 \end{bmatrix}$$

$$[\boldsymbol{r}]\cdot\boldsymbol{x} = \boldsymbol{r}\times\boldsymbol{x}$$