Rodriguez Solution Check

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<< VectorAnalysis`
SetCoordinates[Cartesian[x, y, z]]
```

```
Cartesian[x, y, z]
```

```
r = Sqrt[x^2 + y^2 + z^2];
α = Ω r Cos[Ω r] - Sin[Ω r];
β = 3 α + Ω^2 r^2 Sin[Ω r];
```

```
W = Simplify[Expand[
    -C {α Ω y / r^3 - β x z / r^5, -β y z / r^5 - α Ω x / r^3, β (y^2 + x^2) / r^5 - 2 α / r^3}]]
```

$$\left\{\frac{1}{\left(x^2+y^2+z^2\right)^{5/2}} C \left(-\sqrt{x^2+y^2+z^2}\ \Omega \left(-3 x z + x^2 y \Omega + y \left(y^2+z^2\right) \Omega\right) \text{Cos}\left[\sqrt{x^2+y^2+z^2}\ \Omega\right] + \right.$$

$$\left.\left(x^2 y \Omega + y \left(y^2+z^2\right) \Omega + x^3 z \Omega^2 + x z \left(-3 + y^2 \Omega^2 + z^2 \Omega^2\right)\right) \text{Sin}\left[\sqrt{x^2+y^2+z^2}\ \Omega\right]\right),$$

$$\frac{1}{\left(x^2+y^2+z^2\right)^{5/2}} C \left(\sqrt{x^2+y^2+z^2}\ \Omega \left(3 y z + x y^2 \Omega + x \left(x^2+z^2\right) \Omega\right) \text{Cos}\left[\sqrt{x^2+y^2+z^2}\ \Omega\right] + \right.$$

$$\left.\left(-x y^2 \Omega - x \left(x^2+z^2\right) \Omega + y^3 z \Omega^2 + y z \left(-3 + x^2 \Omega^2 + z^2 \Omega^2\right)\right) \text{Sin}\left[\sqrt{x^2+y^2+z^2}\ \Omega\right]\right),$$

$$-\frac{1}{\left(x^2+y^2+z^2\right)^{5/2}} C \left(\left(x^2+y^2-2 z^2\right) \sqrt{x^2+y^2+z^2}\ \Omega \text{Cos}\left[\sqrt{x^2+y^2+z^2}\ \Omega\right] + \right.$$

$$\left.\left.\left(2 z^2 + x^4 \Omega^2 + y^4 \Omega^2 + y^2 \left(-1 + z^2 \Omega^2\right) + x^2 \left(-1 + 2 y^2 \Omega^2 + z^2 \Omega^2\right)\right) \text{Sin}\left[\sqrt{x^2+y^2+z^2}\ \Omega\right]\right)\right\}$$

```
eqn1 = FullSimplify[Expand[Curl[W] - Ω W]]
```

```
{0, 0, 0}
```

```
Simplify[Div[W]]
```

```
0
```