

```
(%i1) kill(all);
(%o0) done
```

```
(%i1) cross(a,b) := [a[2]*b[3] - a[3]*b[2],
                    a[3]*b[1] - a[1]*b[3],
                    a[1]*b[2] - a[2]*b[1]];
(%o1) cross(a,b) := [a2 b3 - a3 b2, a3 b1 - a1 b3, a1 b2 - a2 b1]
```

□ 1 Check Eq. (30)

```
(%i2) B: 1/r^3*(1-3/r^2*delta_r^2)*[cos(theta), sin(theta), 0];
(%o2) [ (1 - 3*delta_r^2/r^2) cos(theta) / r^3, (1 - 3*delta_r^2/r^2) sin(theta) / r^3, 0 ]
```

```
(%i3) B0: 1/r^3*[cos(theta), sin(theta), 0];
(%o3) [ cos(theta) / r^3, sin(theta) / r^3, 0 ]
```

```
(%i4) A0: 1/r^2*sin(theta)*[0,0,sin(theta)];
(%o4) [ 0, 0, sin(theta)^2 / r^2 ]
```

```
(%i5) omega: [omega_r, omega_theta, omega_phi];
(%o5) [ omega_r, omega_theta, omega_phi ]
```

Eq. (30)

```
(%i6) E30: B = B0 - cross(omega,A0);
(%o6) [ (1 - 3*delta_r^2/r^2) cos(theta) / r^3, (1 - 3*delta_r^2/r^2) sin(theta) / r^3, 0 ] = [ cos(theta) / r^3 -
omega_theta sin(theta)^2 / r^2, omega_r sin(theta)^2 / r^2 + sin(theta) / r^3, 0 ]
```

```
(%i7) E1: first(lhs(E30)) = first(rhs(E30));
(%o7) (1 - 3*delta_r^2/r^2) cos(theta) / r^3 = cos(theta) / r^3 - omega_theta sin(theta)^2 / r^2
```

```
(%i8) E2: second(lhs(E30)) = second(rhs(E30));
(%o8) (1 - 3*delta_r^2/r^2) sin(theta) / r^3 = omega_r sin(theta)^2 / r^2 + sin(theta) / r^3
```

```
(%i9) solve(E1, omega_theta);  
(%o9) [omega_theta =  $\frac{3 \delta_r^2 \cos(\theta)}{r^3 \sin(\theta)^2}$  ]
```

```
(%i10) solve(E2, omega_r);  
(%o10) [ $\omega_r = -\frac{3 \delta_r^2}{r^3 \sin(\theta)}$  ]
```