```
> restart;
> with(LinearAlgebra) : #
> with( plots) :
```

Maple 12

Rodrigues Vector Rotation Formula

$$\boldsymbol{R} := \boldsymbol{r}\cdot\cos(\phi) + (1-\cos(\phi))\cdot(\boldsymbol{r}\bullet\boldsymbol{n})\cdot\boldsymbol{n} + (\boldsymbol{r}\times\boldsymbol{n})\cdot\sin(\phi)$$

```
> x := ⟨1, 0, 0⟩;
```

$$x := \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \quad (1)$$

```
> y := ⟨0, 1, 0⟩;
```

$$y := \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} \quad (2)$$

```
> r := x;
```

$$r := \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \quad (3)$$

```
> n := 1/sqrt(2)·(x + y);
```

$$n := \begin{bmatrix} \frac{1}{2}\sqrt{2} \\ \frac{1}{2}\sqrt{2} \\ 0 \end{bmatrix} \quad (4)$$

```
> ϕ := 3 π/2 :
  R := r·cos(ϕ) + (1 − cos(ϕ))·DotProduct(r, n)·n + CrossProduct(n, r)·sin(ϕ);
```

$$R := \begin{bmatrix} \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2}\sqrt{2} \end{bmatrix} \quad (5)$$

```
> DrawV := proc( )
        local i, N, O, S, F, Z, s, Vzi, ϕ ;
        global x, y, n, r;
        Z := [ ];
        s := evalf( 1/16 );   # ϕ =0 → 3 π/2 , using s increments
        for i from 0 by s to 1.5 do        # 270 degrees rotation
            ϕ := π·i;
            Vzi := evalf( r·cos(ϕ) + (1 − cos(ϕ))·DotProduct(r, n)·n + CrossProduct(n, r)·sin(ϕ) );
    # incremental vectors
            Z := [op(Z), Vzi];     # list of vectors
        end do;
        N := arrow(n, color = black); # vector n
        S := arrow(Z[2..(nops(Z) − 1)], color = yellow) :      # step vectors
        O := arrow(Z[1], color = green);                  # initial vector, vector C
        F := arrow(Z[−1], color = red);            # last vector in the list, vector D
    #   print(The list of vectors); print(Z);
        display([N, O, S, F], axes = normal, tickmarks = [3, 3, 3], scaling = constrained,
                                        orientation = [24, 82]);
        end proc:
> DrawV( );
```