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(* Most of this taken from http://www.chiefdelphi.com/media/papers/2390

   See Mecanum Programming - Single and double joystick *)

(* Let Kf,Ks,and Kt be tuning parameters (0 to+1) for the fwd/rev,
strafe,and spin joystick sensitivities,respectively. *)
Kf = 1;
Ks = 1;
Kt = 1;
Wmax = 1 + Sqrt[2];
(* Let w1,w2,w3,and w4 be the commands to send to each of the 4 wheels,
where w1 is front left,w2 is front right,w3 is rear left,
w4 is rear right,as viewed from the top. *)
(* {fl, fr, rl, rr} *)
w[x_, y_, z_] = {
    Kf * y + Ks * x + Kt * z,
    Kf * y - Ks * x - Kt * z,
    Kf * y - Ks * x + Kt * z,
    Kf * y + Ks * x + -Kt * z
   };
(* {fl, fr, rl, rr} *)
wfromvectors[speed_, direction_, angular_] =
  w[speed * Cos[(90 - direction) * °], speed * Sin[(90 - direction) * °], angular];
(* Direction is angle in degrees from forward,
angular is positive for CW rotation. *)
move[speed_, direction_, angular_] = wfromvectors[speed, direction, angular] / Wmax;

(* Test our definitions against https://
 www.emeraldinsight.com/content_images/fig/0490330405007.png *)
N[move[1, 0, 0]]
N[move[1, -90, 0]]
N[move[1, -45, 0]]
N[move[1, 45, 0]]
(* Can also be -180: *)
N[move[1, 180, 0]]
N[move[1, 90, 0]]
N[move[1, -135, 0]]
N[move[1, 135, 0]]
(* Angular ones might need work *)
N[move[0, 0, 1]]
N[move[0, 0, -1]]
```

Out[454]= {0.414214, 0.414214, 0.414214, 0.414214}

Out[455]= {-0.414214, 0.414214, 0.414214, -0.414214}

Out[456]= {0., 0.585786, 0.585786, 0.}

Out[457]= {0.585786, 0., 0., 0.585786}

Out[458]= {-0.414214, -0.414214, -0.414214, -0.414214}

Out[459]= {0.414214, -0.414214, -0.414214, 0.414214}

Out[460]= {-0.585786, 0., 0., -0.585786}

Out[461]= {0., −0.585786, −0.585786, 0.}

Out[462]= {0.414214, −0.414214, 0.414214, −0.414214}

Out[463]= {−0.414214, 0.414214, −0.414214, 0.414214}

In[473]:=
```
Plot3D[move[1, θ, ω], {θ, -180, 180}, {ω, -1, 1},
 ColorFunction → "DarkRainbow", AxesLabel → Automatic, PlotLegends → Automatic]
```

Out[473]=