```
clc
clear all

% Maximum step size of the ode solver [s]
Ts1 = 1e-6;

% Variables required by the control algorithm
global Ts p v lambda_sw states

% Sampling time of the predictive algorithm [s]
Ts = 20e-6;

% PI speed controller parameters
Tsw = 0.001; % Sampling time of the PI controller [s]
Kp = 0.431; % Proportional gain
Ki = 7.05; % Integrative gain


% IM parameters
J = 0.0032; % Moment of inertia [kg m^2]
p = 2; % Pole pairs
Lm = 0.4183; % Non-saturated magnetizing inductance [H]
Lsl = 0.0171; % Stator leakage inductance
Lrl = 0.0171; % Rotor leakage inductance
Rs = 4.8113; % Stator resistance [Ohm]
Rr = 3.1541; % Rotor resistance [Ohm]

Rm = 1258.3; % Rated iron-loss resistance with accounted SLLs
Rmn = 1012.3; % Rated iron-loss resistance with neglected SLLs
Rsll=1.8751; % Rated SLL resistance

rf_nom = 0.864; % Nominal rotor flux [Wb]
sf_nom = 0.91; % Nominal stator flux [Wb]

T_nom = 10.3; % Nominal torque [Nm]

n_nom = 1390; % Nominal rotor speed [rpm]
wr_nom = n_nom*pi*p/30; % Nominal angular rotor speed [rad/s]

% DC-link voltage [V]
Vdc = 520;

% Initial values of the auxiliary constants
Ls = Lm+Lsl; % Stator inductance [H]
Lr = Lm+Lrl; % Rotor inductance [H]
ts = Ls/Rs; % Stator time constant
tr = Lr/Rr; % Rotor time constant
sigma = 1-(((Lm)^2)/(Lr*Ls));
kr = Lm/Lr;
r_sigma = Rs+kr^2*Rr;
t_sigma = sigma*Ls/r_sigma;

% Switching penalization coefficient
lambda_sw = 0.05;
```

```
% Voltage vectors
v0 = 0;
v1 = 2/3*Vdc;
v2 = 1/3*Vdc + 1j*sqrt(3)/3*Vdc;
v3 = -1/3*Vdc + 1j*sqrt(3)/3*Vdc;
v4 = -2/3*Vdc;
v5 = -1/3*Vdc - 1j*sqrt(3)/3*Vdc;
v6 = 1/3*Vdc - 1j*sqrt(3)/3*Vdc;
v7 = 0;
v = [v0 v1 v2 v3 v4 v5 v6 v7];

% Switching states
states = [0 0 0;1 0 0;1 1 0;0 1 0;0 1 1;0 0 1;1 0 1;1 1 1];
```