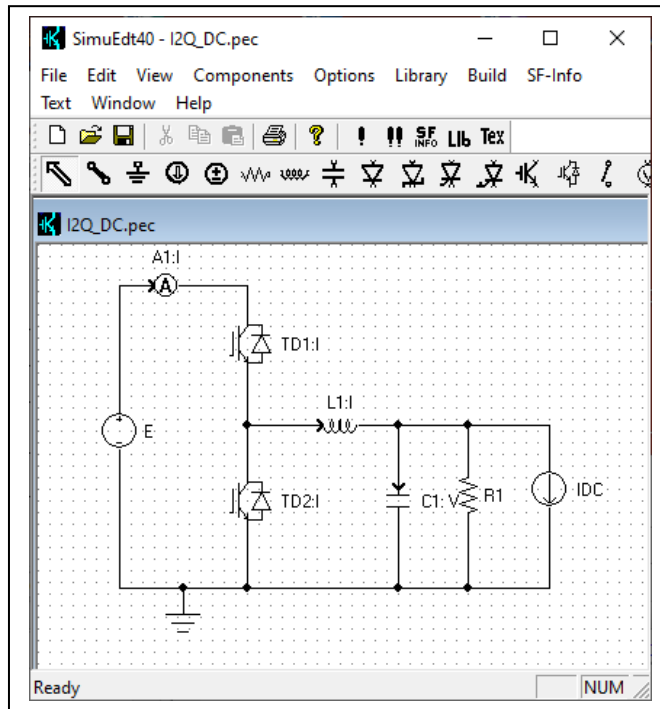


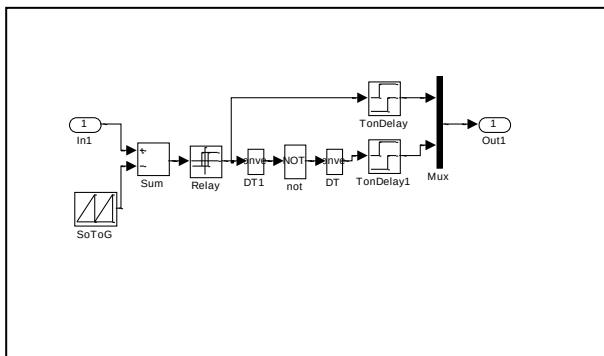
Current two quadrant converter (I2Q_OS)

In this converter the magnitude of the output voltage can be controlled but its polarity can not be changed. However the magnitude and polarity of the output current can be controlled. Since the output current can has opposite polarity to the output voltage, the power flow can be reversed. This converter may be used for both motoring regenerative braking of a dc motors.

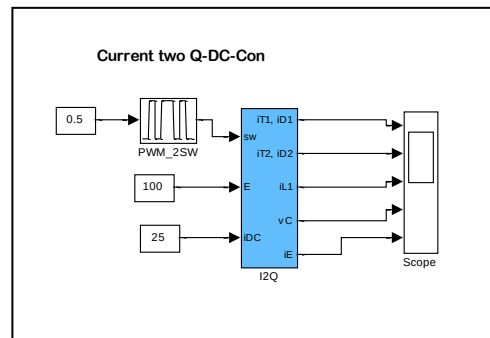


Current two quadrant converter

The figure below shows the **Simulink** model of the Current two quadrant converter “t_I2Q_OS.mdl” including its control. The constant blocks “E” and “D” deliver the value of the input dc voltage E and the duty ratio D respectively. The pulse-width modulator block “PWM-2L-1ph” delivers the switching signals of the converter according to the value of the duty ratio. . It works on the principle of the saw tooth wave crossing method. The two switches of the converter are switched in such a way that before turning-on one of the switches the other switch should be turned-off. In practice there should be a short time interval where both switches are turned-off in order to avoid short circuiting of the dc input circuit as shown below. The converter power circuit is modeled using the C-S-function.



Simulink model of the PWM-2SW



Simulink model of the I2Q_OS converter

When the load current is positive, the converter works in motoring mode delivering power to the load circuit (load voltage and current are both positive).

On the contrary, when the load current is negative the converter works in generating mode, the power flow is reversed i.e. from the load circuit to the source circuit. The load voltage is still positive but the sign of load current is negative.