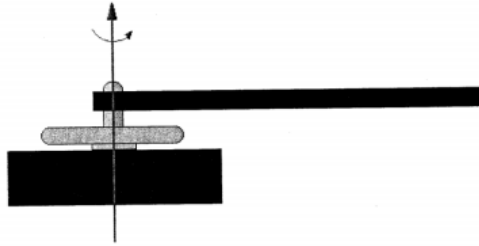


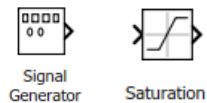
9/8/2018

1. Use Simulink in conjunction with the Quanser interface modules to control the motor-link mechanism to rotate at a desired speed.

The schematic of the motor-link system is shown below.



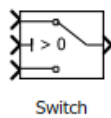
Using the Quanser modules, we can give a sine wave signal to the HIL Write Analog block and the signal will be interpreted by Simulink and eventually transferred to voltage signals and thus controlling the running pattern of the motor. (Note: do not forget to add the HIL Initialize module or the Quanser interface will not work)



To prevent the voltage from going too high, a saturation block was used to limit the voltage magnitude under 5.

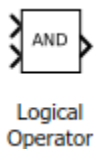
2. Building a closed-loop Simulink model to get the system oscillate the link between  $-45^\circ$  and  $45^\circ$ .

Several blocks are introduced here.



(1)

The switch block can define a threshold value and compare the input2 with it. If the value through input2 satisfies the selected criterion, the switch will connect to input1, otherwise the signal will pass through input 3. The criteria can be selected from  $u2 \geq \text{Threshold}$ ,  $u2 > \text{Threshold}$  or  $u2 \sim 0$ .



(2)

The Logic Operator block applies the operator to the two input signals and output true (1) or false (0). The operator can be defined as AND, OR, NAND, NOR, XOR, NXOR, NOT.



Compare  
To Constant

- (3) The Compare to Constant block can be used to compare the input value with a constant value that is defined by the user. The output is also either true or false.



Memory

- (4) The Memory block can apply a one integration step delay and the output is the previous input value.