

Figure 1 - Armature Controlled Separately Excited DC Motor

[**Electrical System Modelling**]

[**Mechanical System Modelling**]

Te = torque developed by the machine

TL = the load torque to be overcome

ea = back emf

ia = the current in the armature

if = the field current

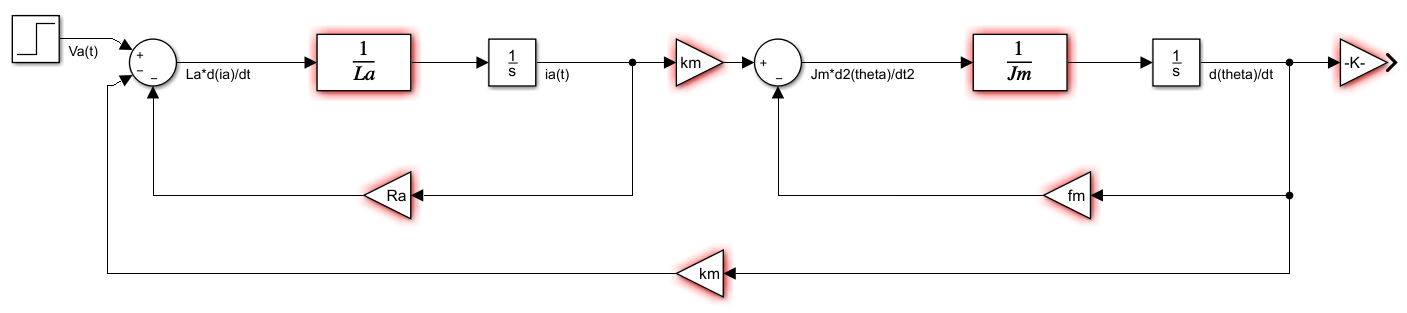


Figure 2 - Modelling of Armature Controlled Separately Excited DC Motor

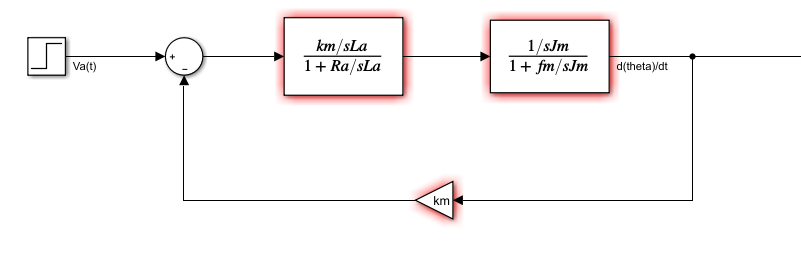


Figure 3 – Using Reducing Block Diagram Methods

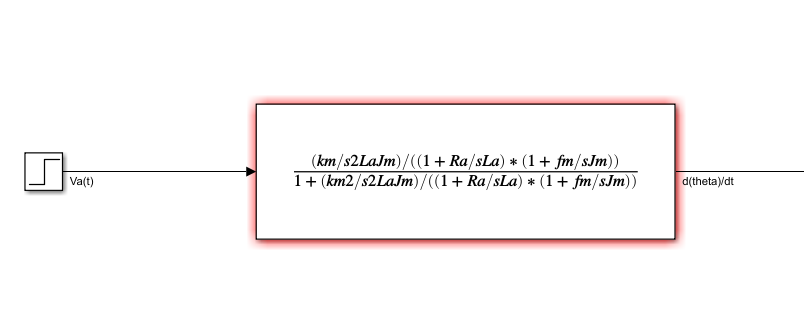


Figure 4 - Modelling of the Motor's Transfer Function

[La = 0.5H , Ra = 1Ω , km = 0.01, Jm = 0.01 , fm = 0.1 ]

[**Transfer Function**]

Wn =

ξ =

poles = -ξwn ± jwn

s1 = -1.499 +j 4.215, s2 = -1.499 – j4.215

τ =

ts = 4τ = 4\*0.677 =2.668(sn) [**settling time**]

wd =

tp =