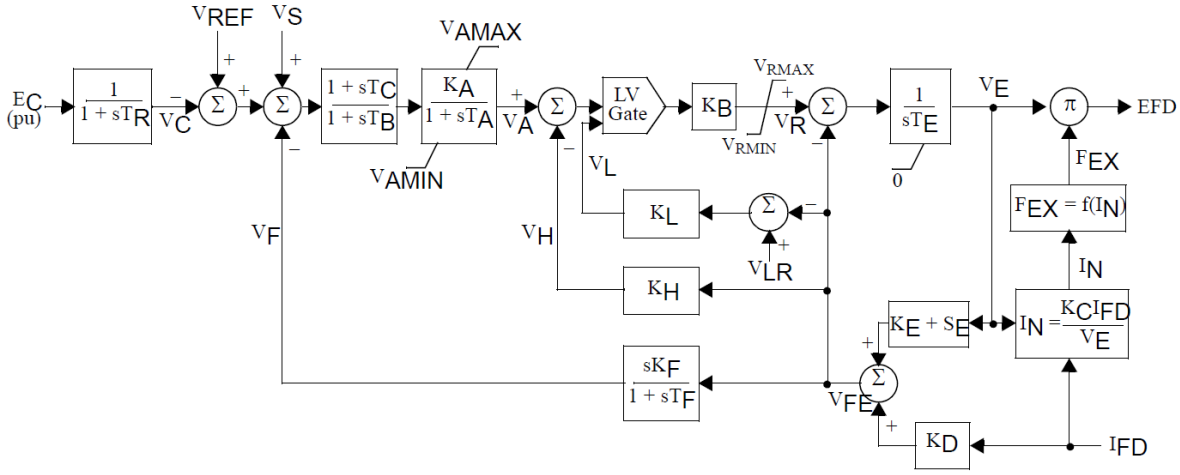
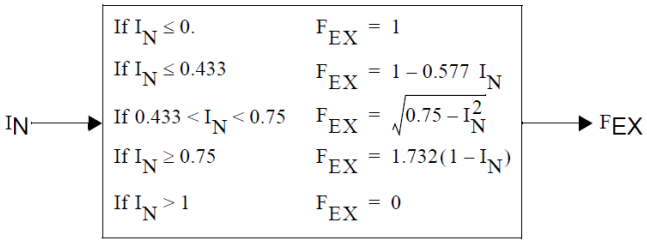
Homework #3 – ECEN 667 Fall 2025

Do not turn in, but please complete before the first exam.

1. Book 5.2
2. Book 5.5 except changed so $X_d = 1.4$ and $X_q = 1.1$
3. Book 4.1
4. Book 4.3
5. The block diagram for an EXAC2 exciter is shown below (reproduced from the PSSE manual). With an initial voltage and field current of 3.1866 and a terminal voltage of 1.0946, manually calculate the initial values of Ve, Va, and Vref
   You may ignore the LV gate. Assume Tr=0.05, Tb=1, Tc=2, Ka=300, Ta=0.02, Vamax=8, Vamin=-8, Kb=20, Vrmax=10, Vrmin=-10, Te=0.8, Kl=10, Kh=0, Kf=0.0, Tf=1, Kc=0.3, Kd=0, Ke=1, VLR=4.4, E1=3.3, SE1=0.3, E2=4.4, SE2=0.08.





V_S = VOTHSG + VUEL + VOEL

6. Book 4.8
7. For the 37 bus case given on the website AGL37_TS, analytically calculate the expected final frequency if the contingency is the outage of the generator at bus 53 (KYLE138). Note, all generators have TGOV1 models with R=0.05. Then perform the simulation in PowerWorld to verify your result.