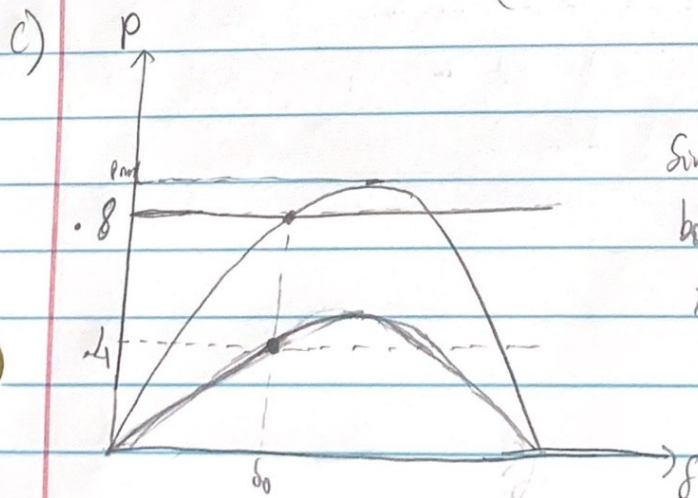
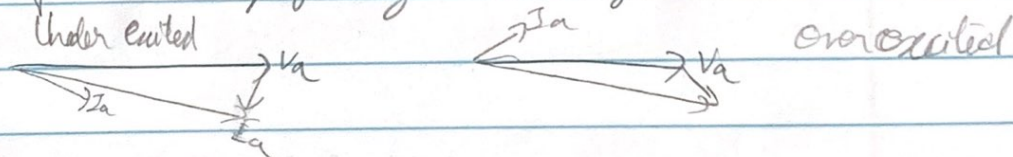


3)

a) The equal area criterion is a technique of checking 2 area segments and seeing if they are equal to see if system can stay in stability. You can think of the two areas as "energy" and if A_1 is bigger than A_2 then the system accelerates out of stability. It is useful for checking how much time you have to clear a fault as that fault clearing time (delta angle) is what makes the areas. The max time, and corresponding angle is known as the "critical clearing angle."

b) There is not an issue running the motor as underexcited or overexcited because only the power factor is changed. This is the case because at underexcited, the motor absorbs reactive power to correct flux and overexcited, the motor supplies reactive power to "lower flux". The motor seems to be "self correcting" and encounters no issue. At very low field current though you may not reach synchronism.



Since the \int is the same for both operating points the integral added over is 0.