PROBLEM III

e) The NASH Equilibrium with 2 players is:

$p_A = p_B = \frac{1}{2} = \alpha^m$

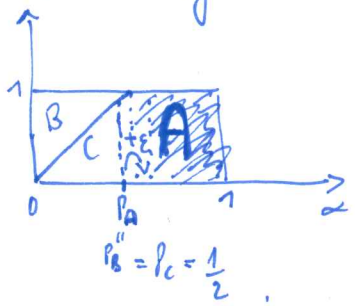
Both parties receive $\frac{1}{2}$ of the votes (i.e. they win with probability $\frac{1}{2}$).

You can check that both players do not have any profitable deviations, i.e. they can not improve their probability of winning by changing policy to any other point in $(0, 1)$.

f) With 3 players, $\alpha^m = \frac{1}{2}$ is not a NASH EQ.

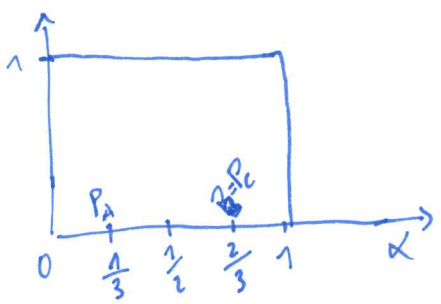
If all parties play $p_A = p_B = p_C = \frac{1}{2}$, they win with probability $\frac{1}{3}$.

Each party can deviate to the policy $\frac{1}{2} + \varepsilon$ where $\varepsilon > 0$ and $\varepsilon$ small, and by doing so increase his probability of winning.




← A deviates to $p_A = \frac{1}{2} + \varepsilon$ and the deviation is profitable (shaded area is $> \frac{1}{2}$)

g)




$p_A = \frac{1}{3}$

$p_B = p_C = \frac{2}{3}$

Party A wins for sure. You can check that neither party B nor C can increase their election probability by changing policy. There are NO profitable deviations.