

Evolution of opinions

Bernard Beauzamy, August 17th, 2005

In all western countries, information is accessible to everyone, the good one as well as the bad one. So we can be surprised : how is it that people have different political opinions ? The information society in which we live should have, as a consequence, a reduction of differences in opinions. But obviously this is not the case : in all countries, differences between parties remain as strong as ever.

The reason is that, for this as for any real life question, human beings act in an irrational manner. Each of us basically reads only what comforts his own opinions, and buys only the newspapers that fit with his own ideas. The same way, each of us meets only with people who have similar ideas, and avoids those who would lead to questioning the acquired certainties.

Let's try to model this. The problem has strong analogies with species evolution, in which one species eats another : here also, the groups eat each other (in an intellectual sense !). The model we used for species evolution is based upon partial differential equations ; here we use probabilities.

At instant $t=0$, we have a population of total size N , made with two groups A and B , of respective sizes a and b , with $a+b=N$. Say that the group A has opinion "left" and the group B opinion "right".

At time $t=1$ (the time interval will be a year), each person in group A may change opinion to group B , with probability p_A . We assume that all think individually, that is all persons behave independently from each other. The same way, any person in group B may shift to A with probability p_B .

The problem is to write, after n years, the law of the random variable which describes the number of people in group A . What are the conditions, on a , p_A , p_B , for one group to become dominant, and therefore for the other group to become extinct ? How many years would it take to go under a certain threshold ?

One may start with the case where both groups are equal in the beginning ($a=b$) and both probabilities are the same ($p_A=p_B$).