

Project Description

- This project is motivated by the set of issues related to the effect of political polarization on the [propaganda](#) battle.
- With the assumption that people are struggling between two parties X and Y with a fixed total population, observing the shift of the people between two parties.
- The goal of our project was to analyze the behavior of whole dynamics systems and the outcome of the propaganda war based on the influence of different factors based on the model of "Rashevsky Neurological Scheme".

Scientific Challenges

- There is a long history of studying rumor models since it permeates the society in a large extent, including philosophy, social and political science, psychology.
- Analyzing social science issue through mathematical modeling and data processing and computation is a fascinating new approach to give us a fresh look on common problem.

Potential Applications

- Our project can be used to analyze and control different factors which are involved in the spread of information.
- Through fully understanding the effect of different factors, people can expect to have a stronger impact on the outcome of the rumor propaganda.

Team Members

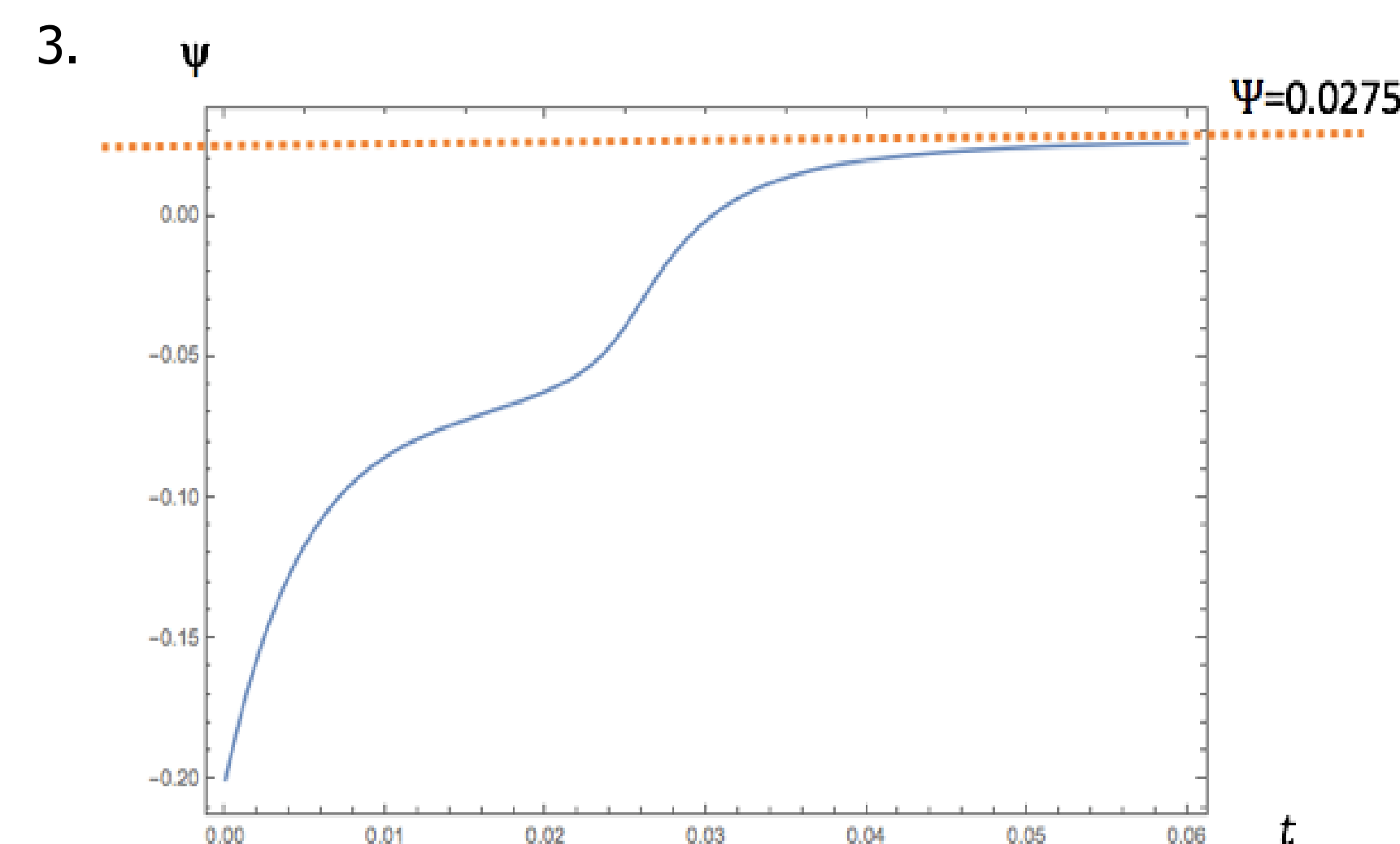
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Model

In the model used there was one main equation

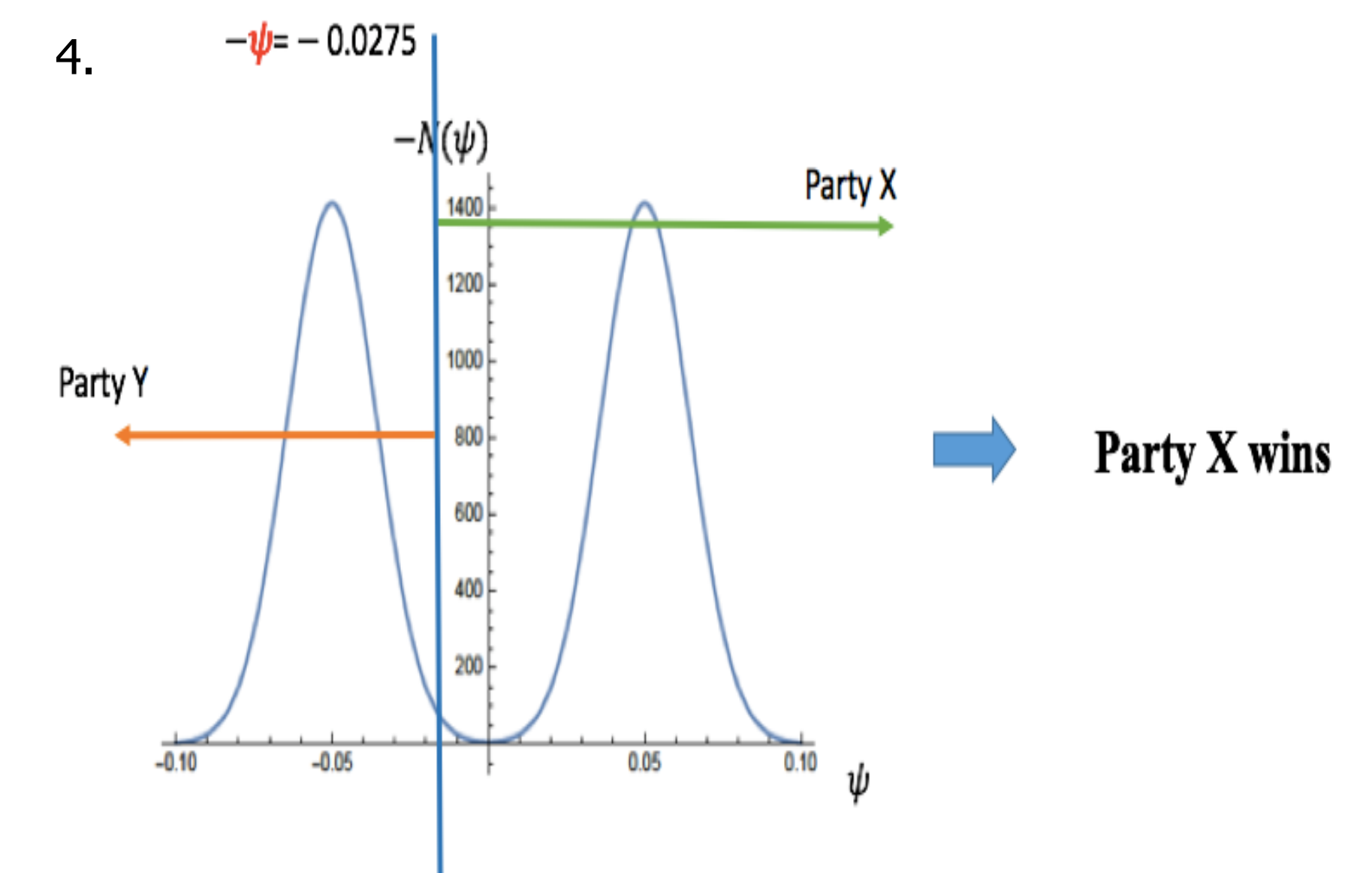
$$\frac{d\psi}{dt} = A\alpha \left[C \left(2 \int_{-\psi}^{\infty} N(\varphi) d\varphi - N_0 \right) + b_1 - b_2 \right] - a\psi$$

ψ the shift of stimuli towards the support of the party X, $A\alpha$ is the general susceptibility of individuals to stimuli, C is the importance of interpersonal communication, $N(\varphi)$ is the distribution of individuals on the installation, N_0 is the total number of individuals, $b_1 - b_2$ is the intensity of the media propaganda of the parties, a is the [decay rate](#)



Glossary of Technical Terms

- Propaganda:** Information, ideas, or rumors deliberately spread widely to help or harm a person, group, movement, institution, nation, etc.
- Decay rate:** The rate of people who do not care about the propaganda battle.



Results

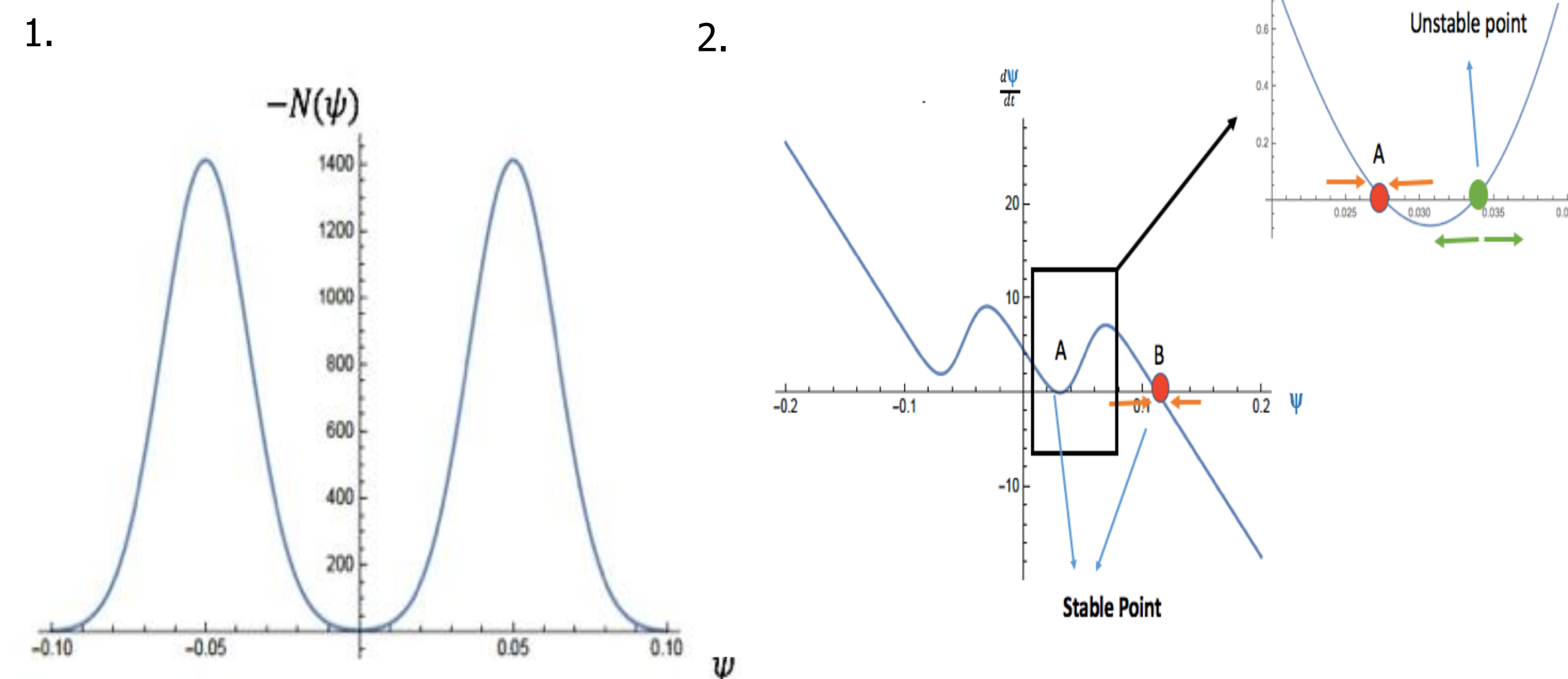
We found the outcome of the propaganda was is heavily influenced by different factors. The value of $-\psi$ is fluctuated between Bi-Model Gaussian Distribution of two parties. When the value of factors approach some specific numbers, the situation of the propaganda was could be switched between two parties.

References

- Mikhailov, A.P. & Petrov, Alexander & Proncheva, Olga. (2017). Modeling the Effect of Political Polarization on the Outcome of Propaganda Battle. COMPUTATIONAL MATHEMATICS AND INFORMATION TECHNOLOGIES. 1. 65-81. 10.23947/2587-8999-2017-1-1-65-81
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- Yanagizawa-Drott D. Propaganda and Conflict: Evidence from the Rwandan Genocide // The Quarterly Journal of Economics. 2014. 129(4). 1947-1994. Doi: 10.1093/qje/qju020

Acknowledgments

This project was mentored by [Jonathan Taylor](#), whose help is acknowledged with great appreciation.



Methodology

- Input the main equation of our model into Wolfram Mathematica to get a graph of the equation.
- Plug in initial values for parameters.
- Solve the differential equation $\frac{d\psi}{dt}$ and get the equilibrium(s).
- Analyze the stability of different equilibrium(s) in the graph and find out the stable point(s).
- Use Wolfram Mathematica to draw the graph of the stable point(s) which is also the value of ψ .
- Plug the value of ψ back to the Bi-Model Gaussian Distribution which tells us the distribution of the supporters to each party.
- Change single parameter and keep other parameters fixed and observe the change of the behavior of the system and outcomes.