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## New opinion dynamics theory including both trust and distrust between people

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**M**ulti-dimensional opinion dynamics including both trust and distrust between people is presented. Addition to previous Bounded Confidence Theory (Hegselmann-Krause 2002), we add distrust between people. Including distrust, we can analyze isolated people or division of society. For network effect of people in society, we use complete network and random network. For the calculation of social division on random network, the polarization is moderated for high link rate and it agree with recent observation of T Tanaka. Using this theory, we can also treat effect of charismatic person and the person who is not trusted by all in the society.

For two-dimensional opinion dynamics, we introduce the two component of opinion as real opinion and expressed opinion or official stance. For the famous play of Romeo and Juliet, thought real opinion of them reach

to consensus formation, official stance of them should be very far because of the conflict of their two families.

### Biography

Akira Ishii is a professor of Applied Mathematics and Physics at the Tottori University, Japan. He is a member of the Physical Society of Japan and the chairman of the Computational Social Science Japan. He obtained a Ph. D. from Waseda University in Tokyo in 1985. After a postdoctoral fellow at the University of Tsukuba in Japan and the Imperial College London, he obtained a tenured research position at Tottori University as assistant professor of Physics. He has experience to stay Fritz Haber Institute of the Max Planck Society as guest professor. He organized four international workshops on applications of big data analysis to computational social science at 2016, 2017, 2018 and 2019 in IEEE Big Data and Web Intelligence. He is an expert in the solid-state theory and the sociophysics. He presented a sociophysics theory "mathematical model for hit phenomena" and a new opinion dynamics theory.

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