Bounded confidence model: addressed information maintain diversity of opinions

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1 Introduction

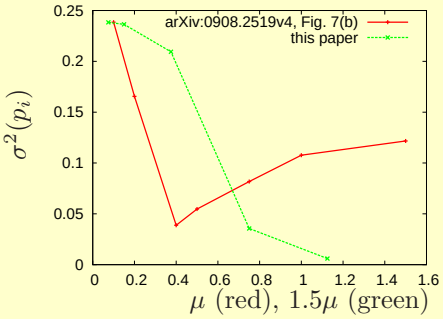
Here we are interested in the problem how messages are received and accepted, as formulated by John Zaller [1].

In this process, a community is subject to a stream of messages from media. They are noticed or not, depending on how their political content fits individual profiles of the receivers; further, they are accepted or not on a similar basis. The model description by Zaller [1] was reformulated in [2] in the spirit of the bounded confidence model [3], where messages are represented as points in the plane of issues.

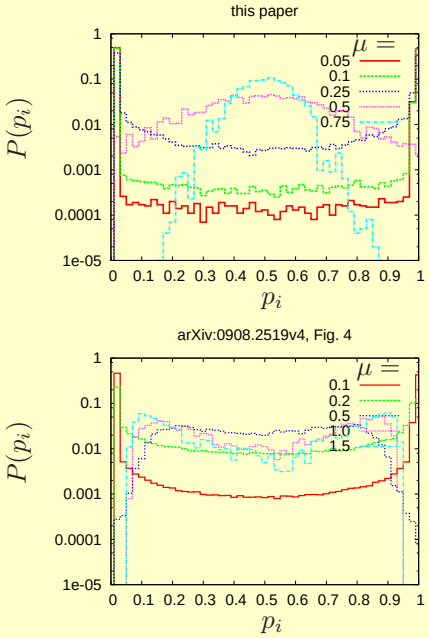
Previously [4], the only criterion to receive a message by an agent was if the distance between this message and the ones received earlier did not exceed the given value of the tolerance parameter μ. Now, agents address their messages to those neighbours which are **most close** in the plane of issues. Moreover, the tolerance parameter for the interpersonal messages is assumed to be **twice larger** than its value for the messages from media.

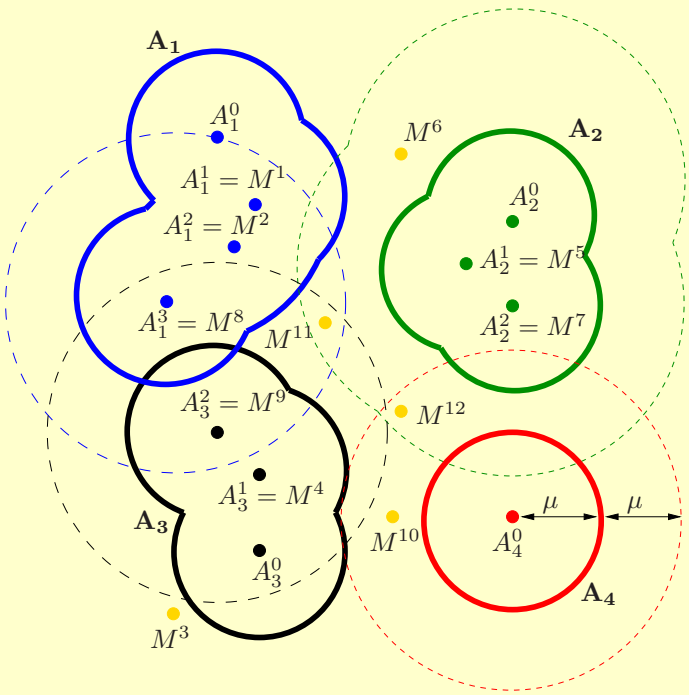
2 Model

The initial agents' positions are A_1^0, A_2^0, A_3^0 and A_4^0. A dozen of subsequent messages appear at the positions $M^1, M^2, \cdots, M^{11}, M^{12}$. Among them messages $M^{3,6,10-12}$ were neglected by all agents. The subsequent sets of messages (M^1, M^2, M^8), (M^5, M^7) and (M^4, M^9) were accepted by agents $i = 1, 2$ and 3, respectively.



The solid lines represent the borders of agent's acceptance area for incoming messages. The dashed lines show the borders for interpersonal interaction (information exchange) among the nearest neighbours. Messages A_1^3 and A_3^2 will be shared among agents $i = 1, 3$ as soon as the message M^9 will arrive.





3 Results

We evaluate the normalised probability p_i of positive answers to some questions asked to i-th agent as

$$p_i = \left[\sum_{j=1}^{\tau(i)} x_i^j H(x_i^j)\right] \Big/ \left(\sum_{j=1}^{\tau(i)} |x_i^j|\right), \qquad (1)$$

where x_i^j is the x-th coordinate of the j-th message received by i-th agent, and $H(x)$ is Heaviside step function. The distribution $P(p_i)$ and variance $\sigma^2(p_i)$ are presented above.

4 Discussion

The role of the parameter of tolerance remains ambiguous. When an interpersonal communication is absent, the tolerance improves understanding of messages from media [2], but in the presence of communication it can lead to unanimity around a random opinion [4]. **Individualised way of communication destroys the unanimity**. As a consequence, the variance of opinions σ^2 decreases monotonously with the mean value of the tolerance parameter μ. Our main conclusion here is that individually addressed messages maintain the diversity.

References

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