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Non-conservative kinetic exchange model of opinion dynamics with randomness and bounded confidence

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The concept of a bounded confidence level is incorporated in a nonconservative kinetic exchange model of opinion dynamics model where opinions have continuous values \$\in [-1,1]\$. The characteristics of the unrestricted model, which has one parameter \$\lambda\$ representing conviction, undergo drastic changes with the introduction of bounded confidence parametrised by \$\delta\$. Three distinct regions are identified in the phase diagram in the \$\delta-\lambda\$ plane and the evidences of a first order phase transition for \$\delta \geq 0.3\$ are presented. A neutral state with all opinions equal to zero occurs for \$\lambda \leq \lambda_{c_1} \simeq 2/3\$, independent of \$\delta\$, while for \$\lambda_{c_1} \leq \lambda \leq \lambda_ {c_2}(\delta)\$, an ordered region is seen to exist where opinions of only one sign prevail. At \$\lambda_{c_2}(\delta)\$, a transition to a disordered state is observed, where individual opinions of both signs coexist and move closer to the extreme values (\$\pm 1\$) as \$\lambda\$ is increased. For confidence level \$\delta < 0.3\$, the ordered phase exists for a narrow range of \$\lambda\$ only. The line \$\delta = 0\$ is apparently a line of discontinuity and this limit is discussed in some detail.

Comments: Figure and new text material added; paper restructured; version

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