Analysis and Existence of Rumor Spreading with Campaign and Punishment Control

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Abstract: Rumors are pieces of unverified information that are spread from individual to individual. The spread of rumors that are not controlled can impact human life in many ways, one of which is that people start to worry about information that is not necessarily true. As such, efforts have been made to curb the spread of gossip through campaigns and punishment to reduce the number of gossip spreaders. This paper proposes the analysis and existence of a rumor-spreading model with campaigns and punishment control. The positivity, uniqueness, and existence of optimal control in the problem are analyzed and proven. In this paper, positivity and uniqueness are employed to validate the control and the unique solution of the rumor spreading model. Furthermore, based on the positivity and uniqueness of the rumor spreading model with control, the existence of optimal control in the model can be solved.

Keywords: *rumors; optimal control; positivity; uniqueness.*

Mathematics Subject Classification (2010): 49Jxx, 49Kxx, 49Lxx, 93Cxx.

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