Communication Countermeasure Strategy Decision-Making Based on Incomplete Information Game

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***Abstract*—In modern battlefields, the stability of wireless communications is crucial for intelligence transmission, command coordination, and maintaining strategic advantage. However, with the rapid advancement of communication technologies, the electromagnetic environment has become increasingly complex, making intelligent decision-making in communication countermeasures a prominent research focus. However, most existing studies adopt deep learning and reinforcement learning methods, which require extensive data samples and computational resources. To address these limitations, this paper proposes a game-theoretic model for intelligent radio communication countermeasures under incomplete information. It quantitatively evaluates common attack and defense tactcis used in communication countermeasures and explores the mixed-strategy equilibrium of the game when both the attackers and defenders consist of multiple types. Furthermore, simulation-based comparative analyses are conducted to assess the factors influencing the utility of both the attacker and defender. The findings offer theoretical insights and decision-making support for the deployment of communication countermeasure strategies in practical military operations, contributing to significant strategic value.**

***Keyword*—communication countermeasures, Harsanyi transformation, incomplete information game, mixed-strategy equilibrium.**

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