

先端科学技術研究科 修士論文要旨

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論文題目	A mathematical model of user-miner interaction through confirmation latency and fees in Bitcoin-type blockchains		
要旨			
<p>In Bitcoin blockchain, miner nodes are likely to choose transactions with high fee to be included in a block. This makes transactions with high fee being processed fast, affecting the amount of transaction fee that users want to pay. The reward for a winning miner consists of transaction fee and newly issued coins, and hence the amount of newly issued coins also affects the miner decision to participate in the mining competition. In addition, mining reward also affects the total hash computing power, which plays an important role of Bitcoin security for reducing the success probability of double spending attack by a malicious miner. In this paper, we develop a mathematical model for analyzing the interaction between miner decision making and user actions in terms of transaction fees, confirmation latency, and security. We analyze the transaction confirmation time with queueing theory, while decision making processes of miners and users are analyzed in the context of Nash equilibrium. The numerical examples show how the mining costs and newly issued coins affect miner decision making.</p>			