



شبكة المعلومات الجامعية  
التوثيق الإلكتروني والميكروفيلم

# بسم الله الرحمن الرحيم



**HANAA ALY**



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التوثيق الإلكتروني والميكروفيلم



# شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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# جامعة عين شمس التوثيق الإلكتروني والميكروفيلم

## قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها  
علي هذه الأقراص المدمجة قد أعدت دون أية تغييرات



## يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



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# **PERFORMANCE STUDY OF POWER ALLOCATION SCHEMES IN ULTRA-DENSE NETWORKS**

By

**Sara Khaled Soliman Alaraby**

A Thesis Submitted to the  
Faculty of Engineering at Cairo University  
in Partial Fulfillment of the  
Requirements for the Degree of  
**MASTER OF SCIENCE**  
in  
**Electronics and Communication Engineering**

FACULTY OF ENGINEERING, CAIRO UNIVERSITY  
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**Title of Thesis :**

**Performance Study of Power Allocation Schemes in Ultra Dense Network**

**Key Words:**

**NOMA; Power Allocation; Resource Management; Ultra-Dense Networks; User Association.**

**Summary :**

In this thesis, user association and power allocation are studied in ultra-dense wireless communication networks, in which access points are densely deployed. The thesis contribution is two-fold. First, with the objective of increasing the system's uplink throughput, two different approaches are proposed for resource sharing. Interference resulting from such resource sharing is reduced by heuristically optimizing the user association to access points as well as power allocation to each user. The thesis compares various power allocations schemes, such as the well-known water-filling algorithm, the recently adopted non-orthogonal multiple access (NOMA), as well as others. In this thesis also, downlink NOMA transmission in ultra-dense networks is studied. Solutions for access points grouping, user association and resource sharing among users are proposed taking into consideration access point locations as well as channel state information.

# Disclaimer

Disclaimer I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute. I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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