Sudan University of Science and Technology

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M.Sc. Programming Electronics Engineering

(communications Engineering)

Performance analysis of Massive MIMO for LTE-Advanced
تحليل اداء نظم الدخل و الخرج المتعددة الهوائية الضخمة في التطور طويل الامد المتقدم

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الآية

قال تعالى:

﴿ وَقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ وَسَتُرَدُّونَ إِلَىٰ عَالِمِ الْغَيْبِ وَالشَّهَادَةِ فَيُنَبِّئُكُم بِمَا كُنتُمْ تَعْمَلُونَ﴾

التوبة(105)

Dedication

To the sun of my life, the loving mother and father, sisters and brothers, husband and my children,
I dedicate this work, it is with their love, kindness and encouragement I prosper and pursue my dreams

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First of all my thanks and gratefulness to Allah, for giving me the strength, patience and confidence to complete this thesis.

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Abstract

Massive MIMO is a promising technique to increase the energy efficiency of cellular network, by deploying hundreds or thousands of antennas at the base station (BS) to perform coherence transceiver processing. Thisthesis focusing into study, analyze the performance of massive MIMO for maximal energy efficiency. All this accomplished by using MATLAB software program which simulate the performance of massive MIMO by using ZF and MRC processing.

مستخلص

نظمالدخلوالخرجالمتعددة الهوائيةالضخمة هي تقنية واعدة لزيادة كفاءة استخدام الطاقة من الشبكة الخلوية، عن طريق نشر مئات أو آلاف الهوائيات في المحطة القاعدة من أجل إجراء معالجة جهاز الإرسال والاستقبال المتسق. هذه الأطروحة تركز في الدراسة، وتحليل أداء لنظمالدخلوالخرجالمتعددة الهوائيةالضخمة لتحقيق أقصى قدر من الكفاءة في استخدام الطاقة. كل هذا أنجز باستخدام برنامج ماتلاب البرمجيات التي تحاكي أداء لنظمالدخلوالخرجالمتعددة الهوائيةالضخمة باستخدام عمليات مختلفة.

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4G	The Fourth Generation of Mobile Telecommunications Technology
BS	Base Station
CSI	Channel State Information
FDD	Frequency Division Duplex
LTE	Long Term Evaluation
LTE-A	Long Term Evaluation – Advanced
MATLAB	Mathematical Laboratory
MIMO	Multiple Input Multiple Output
MRC	Maximum Ratio Combining
MMSE	Minimum Mean Square Error
MU-MIMO	Multi User MIMO
OFDMA	Orthogonal Frequency Division Multiple Access
SC_FDM	Single Carrier Frequency Division Multiplexing
SNR	Signal to Noise Ratio
TDD	Time Division Duplex
UE	User Equipment
ZF	Zero Forcing