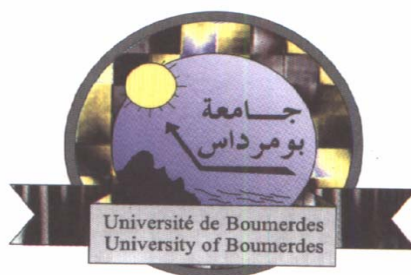


People's Democratic Republic of Algeria
Ministry of higher Education and Scientific Research
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Memoire

Presented in Partial Fulfilment of the requirements of the

MAGISTER DEGREE

In Electrical and Electronic Engineering

Communications

**Use of Genetic Algorithms in Antennas.
Application to Yagi-Uda antenna and antenna arrays**

By

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Year: 2005-2006

ملخص:

استعملت الخوارزميات الوراثية للتوصل إلى هوائيات بأحسن الأداءات و ذلك لأغراض مختلفة. أولاً، تم تصميم الهوائيات من نوع ياغي-أودا بأحسن المواصفات فيما يخص الريح ، مستوى الفصوص الجانبية، وممانعة الدخل باستعمال الخوارزميات الوراثية. ثانياً ، استعملت الخوارزميات الوراثية مرفقة بطريقة شلكونوف للتحليل في تحليل الشبكات الخطية. الهدف هو إيجاد مختلف طويلات و عمد التغذية لتحقيق تلاؤم جيد مع شكل الإشعاع المرغوب فيه. كما مبدأ العمل المطبق على الشبكات الخطية إلى الشبكات المستوية باستعمال مبدأ الفصل. لإثبات قوة الطريقة المنتهجة في هذا العمل، تم اعتبار عدة أمثلة تشمل عدة حالات لأشكال الإشعاع بما في ذلك شكل الإشعاع الموجه.

ABSTRACT

Genetic Algorithms (GAs) are used to optimize antenna performances for different purposes. First, Yagi-Uda antennas are optimized for gain, side lobe levels, and input impedance using Genetic Algorithms.

Next, Genetic algorithms coupled with the Schelkunoff synthesis method are used in the synthesis of equispaced linear arrays. The different excitation amplitudes and phases are found to achieve good matching with a desired radiation pattern.

The approach used in linear arrays is then extended to synthesize planar arrays using the separation principle. Examples which demonstrate the versatility of the approach presented in this work are considered for various patterns including the steered pattern case.

Résumé

Les algorithmes génétiques sont utilisés pour optimiser la performance de l'antenne pour différents objectifs. En premier lieu, les antennes de type Yagi-Uda sont optimisées pour le gain, le niveau de lobes secondaires, et l'impédance entrée en utilisant des algorithmes génétiques.

Ensuite, les algorithmes génétiques couplés avec la méthode de synthèse de Schelkunoff sont employés dans la synthèse des réseaux linéaires équidistants. Les différentes amplitudes et phases d'excitations sont obtenues pour réaliser un bon assortiment avec un diagramme de rayonnement désiré.

L'approche utilisée dans la synthèse des réseaux linéaires est étendue à la synthèse des réseaux plans en utilisant le principe de séparation. Des exemples qui démontrent la polyvalence de l'approche présentée dans ce travail sont inclus pour différentes formes de diagrammes de rayonnement y compris le cas du diagramme orientées.

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