Scopus

Document details

→] Export   ↓ Download   🖶 Print   ✉ E-mail   Save to PDF   ☆ Add to List   More... ›

Full Text   View at Publisher

Null positioning of dipole antenna array considering coupling effect (Article)

Malek, N.A. ✉,   Ramli, N.M.,   Abdullah, K.

Electrical and Computer Engineering Department, Faculty of Engineering, International Islamic University Malaysia, Kuala Lumpur, Malaysia

Abstract   ⌄ View references (29)

Antenna array is a set of antennas that are arranged together with different excitations (amplitude and phase) and used in beamforming techniques. The difference in phases are combined together to make the array acting like a single antenna with better steering capability over a single antenna. However, the receiving antenna arrays are influenced by intentional or unintentional interference. In this research, a null positioning technique has been introduced to the antenna array to efficiently mitigate the interference. An efficient method utilizing Genetic Algorithm (GA) is used to position the nulls in the direction of interference of circular array dipole antennas. In forming the null, GA randomly searches the best fitness function to position the null to any direction. Then, the effect of mutual coupling between the antenna elements is also considered in this research. As a result, the accuracy of radiation pattern of antenna array will be increased. It is observed that the mutual coupling decreases when the spacing between element increases. The simulation results show that nulls can be steered successfully using GA with and without mutual coupling effect. The mutual coupling effect has been taken into account and need to be considered especially in a closely spaced antenna arrays. © 2017 Praise Worthy Prize S.r.l. - All rights reserved.

Author keywords

Antenna arrays   Beamforming   Genetic algorithm   LTE   Mutual coupling   Null positioning   Wimax

References (29)   View in search results format ›

☐ All   Export   🖶 Print   ✉ E-mail   Save to PDF   Create bibliography

☐ 1   Huang, G.C., Iskander, M.F., Hoque, M.

Advanced antenna array designs for directional networks

(2016) Proceedings - IEEE Military Communications Conference MILCOM, art. no. 7795326, pp. 204-207. Cited 4 times.
ISBN: 978-150903781-0
doi: 10.1109/MILCOM.2016.7795326

View at Publisher

☐ 2   Lam, T.

Null steering antenna array using phase-only weights

(2014) IEEE Antennas and Propagation Society, AP-S International Symposium (Digest), art. no. 6905156, pp. 1660-1661. Cited 2 times.
ISBN: 978-147993540-6
doi: 10.1109/APS.2014.6905156

View at Publisher

Metrics ⓘ

0   Citations in Scopus

0   Field-Weighted Citation Impact

Cited by 0 documents

Inform me when this document is cited in Scopus:

Set citation alert ›

Set citation feed ›

Related documents

Synthesis of Gaussian beams in the near-field of linear arrays
Bray, M.G. , Werner, D.H.
(2010) 2010 IEEE International Symposium on Antennas and Propagation and CNC-USNC/URSI Radio Science Meeting - Leading the Wave, AP-S/URSI 2010

Advanced directional networking: Simulation results and prototype measurements
Huang, G.C. , Qazi, F.A. , Iskander, M.F.
(2017) 2017 IEEE Antennas and Propagation Society International Symposium, Proceedings

On the convergence characteristics of flower pollination algorithm for circular array synthesis
Chakravarthy, V.V.S.S.S. , Rao, P.M.
(2015) 2nd International Conference on Electronics and Communication Systems, ICECS 2015

View all related documents based on references

Find more related documents in Scopus based on:

Authors ›   Keywords ›

3   Chakravarthy, V.V.S.S.S., Rao, P.M.

Amplitude-only null positioning in circular arrays using genetic algorithm

(2015) *Proceedings of 2015 IEEE International Conference on Electrical, Computer and Communication Technologies, ICECCT 2015*, art. no. 7226120. Cited 6 times.
ISBN: 978-147996084-2
doi: 10.1109/ICECCT.2015.7226120

View at Publisher

4   Ismail, T.H., Dawoud, M.M.

Null Steering in Phased Arrays by Controlling the Element Positions

(1991) *IEEE Transactions on Antennas and Propagation*, 39 (11), pp. 1561-1566. Cited 95 times.
doi: 10.1109/8.102769

View at Publisher

5   Lee, Y.-J., Seo, J.-W., Ha, J.-K., Park, D.-C.

Null steering of linear phased array antenna using genetic algorithm

(2009) *APMC 2009 - Asia Pacific Microwave Conference 2009*, art. no. 5385356, pp. 2726-2729. Cited 11 times.
ISBN: 978-142442802-1
doi: 10.1109/APMC.2009.5385356

View at Publisher

6   Rao, J., Xu, X., Wang, Q.

Mutual coupling compensation of array antenna pattern

(2015) *Proceedings of 2015 IEEE International Conference on Communication Software and Networks, ICCSN 2015*, art. no. 7296142, pp. 143-146.
ISBN: 978-147991983-3
doi: 10.1109/ICCSN.2015.7296142

View at Publisher

7   Huang, Q.
(2011) *Nulling Algorithm for a Seven Element GPS Array*
SIM University, Report No. JAN2011/ENG/010

8   Mukherjee, S., Kar, S.
Application of fuzzy mathematics and grey systems in education
(2012) *Journal of King Saud Univ. Comput. Inf. Sci.*, 24, pp. 157-163. Cited 2 times.

9   Fahmy, A.A.
Using the bees algorithm to select the optimal speed parameters for wind turbine generators
(2012) *Journal King Saud Univ. Comput. Inf. Sci*, 24, pp. 17-26. Cited 8 times.

10   Haupt, R.L., Werner, D.H.
(2007) *Genetic Algorithms in Electromagnetics..* Cited 382 times.
IEEE Press Wiley-Interscience

11   Mandal, S., Ghoshal, S.P., Kar, R., Mandal, D.
(2012) *J. King Saud Univ. Comput. Inf. Sci 2012*, 24, pp. 83-92. Cited 57 times.

12 Noaman, A.A., Abdallah, A.K.S., Ali, R.S.

Optimal sidelobes reduction and synthesis of circular array antennas using hybrid adaptive genetic algorithms

(2010) *4th Microwave and Radar Week, MRW-2010 - 18th International Conference on Microwaves, Radar and Wireless Communications, MIKON 2010 - Conference Proceedings*, art. no. 5540467. Cited 3 times.
ISBN: 978-142445914-8

13 Yallaparagada, N.T., Hardel, G.R., Mandal, D., Bhattacharjee, A.K.

Genetic Algorithm for null synthesizing of circular array antennas by amplitude control

(2011) *ISCI 2011 - 2011 IEEE Symposium on Computers and Informatics*, art. no. 5958873, pp. 1-5. Cited 4 times.
ISBN: 978-161284690-3
doi: 10.1109/ISCI.2011.5958873

View at Publisher

14 Bhattacharyya, A.K.

Active element pattern symmetry for asymmetrical element arrays

(2007) *IEEE Antennas and Wireless Propagation Letters*, 6, art. no. 898549, pp. 275-278. Cited 4 times.
doi: 10.1109/LAWP.2007.898549

View at Publisher

15 Balanis, C.
(2005) *Antenna theory*. Cited 1736 times.
3rd ed. Hoboken, NJ: Wiley Interscience

16 Slimani, A., Bennani, S.D., El Alami, A., Harkat, H.

Conception and optimization of patch array antenna for WiMAX applications using stubs and slots techniques matching

(2015) *International Journal on Communications Antenna and Propagation*, 5 (1), pp. 39-45. Cited 8 times.
http://www.praiseworthyprize.it/public/SUBSCRIBERS/IRECAP.html

View at Publisher

17 Elkamchouchi, H.M., Mohamed, D.A.E., Mohamed, O.G., Ali, W.A.E.

Multiuser detection using blind robust beamforming in multipath environment for LTE system

(2016) *International Journal on Communications Antenna and Propagation*, 6 (5), pp. 291-298. Cited 3 times.
http://www.praiseworthyprize.org/jsm/index.php?journal=irecap&page=article&op=download&path%5B%5D=19539&path%5B%5D=pdf_121
doi: 10.15866/irecap.v6i5.10006

View at Publisher

18 Shankpal, P., Arur, V.V., Kadambi, G.R., Karthikeyan, B.R., Shuttleworth, J.

A novel approach for near field beamforming

(2014) *International Journal on Communications Antenna and Propagation*, 4 (3), pp. 64-76.
http://www.praiseworthyprize.it/public/SUBSCRIBERS/IRECAP.html

19 Poonkuzhali, R., Thiripurasundari, D., Alex, Z.C., Balakrishnan, T.

Compact printed dipole antenna for L-band radar applications

(2015) *International Journal on Communications Antenna and Propagation*, 5 (4), pp. 178-182. Cited 2 times.
http://www.praiseworthyprize.it/public/SUBSCRIBERS/IREMOS.html

View at Publisher

20 Sundereswaran, K., Srinivasa Rao Nayak, P., Chandra Sekhar, A.

Development of an improved particle swarm optimization (PSO) and its application to induction motor soft-starting

(2014) *International Review of Automatic Control*, 7 (2), pp. 156-165. Cited 2 times.
http://www.praiseworthyprize.com/ireaco.htm

21 Sangwato, S., Oonsivilai, A.

Optimal power flow with interline power flow controller using hybrid genetic algorithm

(2015) *International Review of Electrical Engineering*, 10 (6), pp. 727-733. Cited 2 times.
http://www.praiseworthyprize.it/public/SUBSCRIBERS/IREE.html

View at Publisher

22 Shamsudin, N.H., Iszhal, N.B., Abdullah, A.R., Basir, M.S.S.M., Sulaima, M.F.

An improved crossover genetic algorithm with distributed generator (DG) installation for DNR restoration in reducing power losses

(2015) *International Review on Modelling and Simulations*, 8 (5), pp. 566-575. Cited 2 times.
http://www.praiseworthyprize.it/public/SUBSCRIBERS/IREMOS.html
doi: 10.15866/iremos.v8i5.6983

View at Publisher

23 El Kebir, A., Belhadj, H., Chaker, A., Negadi, K.

Internal model control based on Gann for a temperature control electrical furnace

(2014) *International Review on Modelling and Simulations*, 7 (5), pp. 884-892. Cited 3 times.
http://www.praiseworthyprize.it/public/SUBSCRIBERS/IREMOS.html#Authentication_Area

View at Publisher

24 Essalmi, A., Mahmoudi, H., Bennassar, A., Akherraz, M., Abbou, A.

Genetic algorithm vector control of permanent magnet synchronous motor based on neuro space vector modulation

(2014) *International Review on Modelling and Simulations*, 7 (3), pp. 436-443. Cited 5 times.
http://www.praiseworthyprize.com/iremos.htm

25 Dileep, M.V., Kamath, S., Nair, V.G.

Ascent phase trajectory optimization of launch vehicle using theta-particle swarm optimization with different thrust scenarios

(2016) *International Review of Aerospace Engineering*, 9 (6), pp. 200-207. Cited 4 times.
http://www.praiseworthyprize.org/jsm/index.php?journal=irease&page=article&op=download&path%5B%5D=19696&path%5B%5D=pdf_64
doi: 10.15866/irease.v9i6.10521

View at Publisher

26   Remesh, N., Ramanan, R.V., Lalithambika, V.R.

Fuel optimum lunar soft landing trajectory design using different solution schemes

(2016) *International Review of Aerospace Engineering*, 9 (5), pp. 131-143. Cited 5 times.
http://www.praiseworthyprize.org/jsm/index.php?
journal=irease&page=article&op=download&path%5B%5D=19460&path%5B%5D=pdf_57
doi: 10.15866/irease.v9i5.10119

View at Publisher

---

27   Mezhoud, N., Leulmi, S., Boukadoum, A.

AC-DC optimal power flow incorporating shunt FACTS devices using HVDC model and particle swarm optimization method

(2014) *International Review of Electrical Engineering*, 9 (2), pp. 382-392. Cited 4 times.
http://www.praiseworthyprize.com/journals/IREE_issues.html

---

28   Kerdphol, T., Qudaih, Y.S., Mitani, Y.

Optimal Battery Energy Storage size using particle swarm optimization for microgrid system

(2015) *International Review of Electrical Engineering*, 10 (2), pp. 277-285. Cited 7 times.
http://www.praiseworthyprize.it/public/SUBSCRIBERS/IREE.html

View at Publisher

---

29   Medeswaran, R., Kamaraj, N.

Optimal allocation of multi-type FACTS devices for loadability improvement in the power system using evolutionary computation techniques

(2014) *International Review of Electrical Engineering*, 9 (2), pp. 407-413. Cited 4 times.
http://www.praiseworthyprize.com/journals/IREE_issues.html

About Scopus

What is Scopus

Content coverage

Scopus blog

Scopus API

Privacy matters

Language

日本語に切り替える

切換到简体中文

切換到繁體中文

Русский язык

Customer Service

Help

Contact us

ELSEVIER

Terms and conditions   Privacy policy

RELX Group™