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

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Abstract

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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

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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

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-
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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
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-
- 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

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