

Array design with Meep simulation scripts

g.l. gragnani <gianluigi.gragnani@unige.it>

Sat 2/13/2021 1:43 AM

To: Hanson, Jordan <jhanson2@whittier.edu>

Cc: Alessandro Fedeli <alessandro.fedeli@unige.it>

Dear Prof Hanson,

we have read your very interesting paper "Broadband RF Phased Array Design with MEEP: Comparisons to Array Theory in Two and Three Dimensions", recently appeared on Electronics.

As you know open-source software for electromagnetics is among our research interests. We would like to kindly ask you whether it is possible to obtain some of the simulation scripts as mentioned in the paper.

Thank you very much in advance.

Best regards.

Alessandro Fedeli

Gian Luigi Gragnani

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Diten - University of Genoa

Via Opera Pia 11A, 16145 Genova, Italy

phone: + 39 010 33 52756


Re: Array design with Meep simulation scripts

Hanson, Jordan <jhanson2@whittier.edu>

Sat 2/13/2021 2:10 PM

To: g.l. gragnani <gianluigi.gragnani@unige.it>

Cc: Alessandro Fedeli <alessandro.fedeli@unige.it>

 1 attachments (79 KB)

PhaseArray-rotate.ipynb;

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Best Regards,

Jordan Hanson

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meep.readthedocs.io

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Re: Array design with Meep simulation scripts

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Mon 2/15/2021 11:42 PM

To: Hanson, Jordan <jhanson2@whittier.edu>

Cc: Alessandro Fedeli <alessandro.fedeli@unige.it>

Dear Jordan,

thank you very much for your prompt reply.

Your script is working like a charm, and is a very good starting point to learn Meep.

Collaborating is a great idea. We are mostly interested in 3D modelling for antennas and RF devices.

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Best regards.

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Re: Array design with Meep simulation scripts

Hanson, Jordan <jhanson2@whittier.edu>

Sat 2/20/2021 10:48 AM

To: g.l. gragnani <gianluigi.gragnani@unige.it>

Cc: Alessandro Fedeli <alessandro.fedeli@unige.it>

 1 attachments (95 KB)

PhaseArray_hornArray.ipynb;

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Tue 2/23/2021 12:44 AM

To: Hanson, Jordan <jhanson2@whittier.edu>; Alessandro Fedeli <alessandro.fedeli@unige.it>

Dear Jordan,

once again, your code works very well. As for the evaluation of S11, we cannot provide any insight, at least for Meep. You could check how GprMax or OpenEMS work.

In our opinion the starting point could be simply to compute I and V at the feeding gap, by means of the integration capabilities of Meep and further try to implement more elaborated feeding ports. Perhaps, the simulation of a single antenna in 3D could provide results more simple to analyze.

There are some old, yet very interesting papers, about the modelling of lumped elements and "soft" generators in FDTD code.

V. A. Thomas, M. E. Jones, M. Piket-May, A. Taflove and E. Harrigan, "The use of SPICE lumped circuits as sub-grid models for FDTD analysis," in *IEEE Microwave and Guided Wave Letters*, vol. 4, no. 5, pp. 141-143, May 1994, doi: 10.1109/75.289516.

R. J. Luebbers and H. S. Langdon, "A simple feed model that reduces time steps needed for FDTD antenna and microstrip calculations," in *IEEE Transactions on Antennas and Propagation*, vol. 44, no. 7, pp. 1000-1005, July 1996, doi: 10.1109/8.504308.

Mix, J., Dixon, J., Popovic, Z. and Piket-May, M. (1999), Incorporating non-linear lumped elements in FDTD: the equivalent source method. *Int. J. Numer. Model.*, 12: 157-170. [https://doi.org/10.1002/\(SICI\)1099-1204\(199901/04\)12:1/2<157::AID-JNM323>3.0.CO;2-V](https://doi.org/10.1002/(SICI)1099-1204(199901/04)12:1/2<157::AID-JNM323>3.0.CO;2-V)

We also found an MS thesis at this link <https://ttu-ir.tdl.org/bitstream/handle/2346/12301/31295019601334.pdf?sequence=1>

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