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Transmission line meshes for computational simulation of electromagnetic modes in the Earth's atmosphere. (English) Zbl 1141.78313
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Summary: Two transmission line meshes to simulate electromagnetic waves in the Earth's atmosphere are developed, one with the link transmission lines connected in parallel and the other with connections in series. The equations describing propagation of waves through these parallel or series meshes are equivalent to the Maxwell equations for TE_r or TM_r modes in a spherical cavity with lossy dielectric material between the external conducting surfaces, respectively. The transmission line meshes are used for a numerical study of the natural electromagnetic noise due to lightning discharges in the Earth-ionosphere cavity. The numerical algorithm finds values for Schumann resonances very close to the experimental ones, which allows us to affirm that this methodology is a valid numerical tool for predicting these resonances on other planets or moons as well.

MSC:

- [78A40](#) Waves and radiation in optics and electromagnetic theory
- [78A50](#) Antennas, waveguides in optics and electromagnetic theory
- [86A25](#) Geo-electricity and geomagnetism

Full Text: [DOI](#)

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