

## عنوان مقاله:

Design and Optimization of a Dual Polarized Hat Feed Reflector Antenna

## محل انتشار:

مجله نوآوری های مهندسی برق و کامپیوتر، دوره 10، شماره 2 (سال: 1401)

تعداد صفحات اصل مقاله: 8

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## خلاصه مقاله:

**Background and Objectives:** Self-supported rear-radiating feeds have been widely used as reflector antenna feeds for mini terrestrial and satellite links. While in most terrestrial and satellite links a dual-polarized antenna for send and receive applications are required, all of the reported works regarding this topic are presenting a single polarized self-supported reflector antenna. In this paper, a dual-polarized hat feed reflector antenna with a low sidelobe and low cross-polarization level is presented. **Methods:** The proposed antenna consists of an orthogonal mode transducer (OMT), a 60 cm ring focus reflector, and a rear radiating waveguide feed known as the hat feed. 21 parameters of hat feed structure are selected and optimized with a genetic algorithm (GA). A predefined ring focus curve is used as a reflector in the optimization procedure. Dual polarization for send and receive applications is also obtained by an OMT at the rear side of the reflector antenna. **Results:** A prototype of the proposed hat feed reflector antenna is fabricated and the measurement results are compared with simulation ones. The proposed antenna has return loss better than 15 dB at both polarizations in the 17.7~19.7 GHz frequency range. The 60cm reflector antenna has 4dBi gain which means that the proposed antenna has about 70% radiation efficiency. About 20dB sidelobe level and more than 40 dB cross-polarization have also been realized in the measurement patterns of the proposed antenna. **Conclusion:** A dual-polarized hat feed reflector antenna with excellent radiation efficiency, high sidelobe, and low cross-polarization level is proposed. The proposed antenna can be a good candidate for high-frequency terrestrial and satellite communications

## کلمات کلیدی:

Self-supported Feed, Ring-focus Reflector, Genetic Algorithm, Orthogonal Mode Transducer

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