

CURRENT DISTRIBUTION OF A CENTRE-FED  
FEED-POINT DISPLACED DIPOLE ANTENNA

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A B S T R A C T

The importance of the investigation on the different behaviours of a centre-fed feed-point displaced dipole antenna was apparent after the development of log-periodic dipole (LPD) arrays. LPD arrays are generally being used in the VHF and UHF ranges. But very recently the development of stripline type LPD array which will be ideal as a broad band antenna in the lower range of microwave spectrum. As such, LPD array becomes an important tool for UHF and microwave communication. So critical studies on the different aspects of this array are required. It has been found that for the proper feeding of a LPD array, the feed points of each dipole have to be displaced transverse to dipole axis. Mathematical analysis of the radiation patterns, power gain, radiation resistance and effective aperture of centre-fed dipole antenna with feed points displaced transverse to its axis are already available in literature. Generalised studies on the radiation characteristics, input impedance and mutual impedance of the same have also been carried out by one of the present authors.

The above analyses were developed under the following assumptions :

- i) The dipole is extremely thin.
- ii) The current distribution is sinusoidal.
- iii) The coupling between the dipole and the feeder line is negligible.
- iv) The radiation from ends is also negligible.

But in the actual case the current distribution will not be sinusoidal. With a view to have a very critical idea of the current distribution of the said configuration and as there is no literature available on this, the authors initiate the present investigation.

Firstly, the derivation of the integral equation for the current of the feed-point displaced dipole antenna has been carried out. Then a trigonometric approximation to the current has been considered for the solution of the integral equation of the proposed configuration. The expression for the input impedance has also been derived.