Title: GTD (Geometrical theory of Diffraction) based RF simulation of a reconfigurable space antenna activated using SMA (Shape Memory Alloy) based smart actuators.

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Abstract Body (up to 300 words):

Active control of radiation patterns of antenna have large number of potential applications in space as well as ground segment. Such reconfigurable antenna has primarily two functionalities, namely beam steering and beam shaping. There are suitable antenna techniques available, which can achieve both steering and shaping using the mechanisms based on Shape memory alloys. Electromagnetic far field intensity pattern in those models is calculated using the GO (Geometrical optics) technique. Geometrical optic techniques are fundamental but still do not cover the complete essence of the optical phenomenon. The GO assumes ideal conditions which are very difficult to achieve in a practical antenna system. It do not mention the diffraction patterns created by the reflecting waves. There are certain other complications which have not been solved. For example, the feed position for calculating the intensity pattern is considered perfectly at the focal point, zero root mean square (RMS) error of the reflector surface, negation of the effect of feed holding structure and so on. Our study incorporates all the features of the geometrical theory of diffraction for the calculation of far field intensity pattern of antenna in both beam shaping and bean steering conditions which gives better and accurate radiation patterns. A methodology of achieving surface coordinates for desired radiation pattern is also calculated. Finally, the study provides useful insights into the design of flexible and reconfigurable antenna system for space applications.

Biography:

Aashutosh Trivedi is an undergraduate student in Mechanical department of IIT (Indian Institute of Technology) Jammu, currently in 7th semester. He is a member of SAE India and a position holder at automobile club of IIT Jammu. In past he has been the member of robotics club, IIT Jammu.

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