**Simulation of Three-dimensional of Wave Refraction Pattern Using ENVISAT ASAR Data**

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**Keywords:** Quasi-Linear model**,** Wave refraction, quasi-linear model, first order Partial Differential Equation (PDEs).

**Abstract:**

Synthetic Aperture Radar (SAR) has been recognized as a powerful tool for modeling ocean waves and forecasting over an area of 300 km x 300 km. The quantitative descriptors of the ocean surface wave properties such as wave height and wave slope spectra can retrieve from several satellite SAR missions, such as ENVISAT ASAR data.The retrieving techniques of sea surface quantitative descriptors involve linear and nonlinear techniques. In linear technique, Modulation Transfer Function (MTF) used to relate SAR spectra image with real sea surface spectra. This study has demonstrated a new approach for the simulation of wave refraction pattern in airborne radar data. In doing so, the quasi-linear algorithm used to model significant wave height based on the new approach of the azimuth cutoff algorithm. The study shows that wave refraction pattern can simulate from ENVISAT ASAR data with convergence and divergence spectra energy of 0.84 and 0.4 m2 sec, respectively. In conclusion, modification of the conventional azimuth cutoff algorithm can be used to retrieve significant wave height in Cvv- band data under circumstances of wave transformation using first order Partial Differential Equation (PDEs).