

Abstract Submitted  
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**fixed-bias probe measurement of space plasma parameters.**<sup>1</sup>

RICHARD MARCHAND, JOSHUA GUTHRIE, Univ of Alberta — A combination of theory and multivariate regression is used to infer a satellite floating potential from currents collected with three or more cylindrical probes with different fixed bias voltages with respect to a spacecraft. Using a scaling law derived in the Orbital Motion Limited (OML) approximation, currents can be used to infer a satellite floating potential, as well as the density and temperature of background plasma. Corrections to these estimates can then be made using multivariate regression based on Radial Basis Functions (RBF) interpolation. Training of the RBF correction model, makes use of a synthetic data set, or solution library, constructed with three-dimensional kinetic simulations from which collected currents are calculated as a function of probe voltages, in a range of plasma environment parameters relevant to ionospheric plasma encountered by satellites in low Earth orbit (LEO). These currents in turn can be used to infer approximate values of the electron plasma density, temperature, and satellite potential using the OML estimates. The RBF model is then trained to approximate the discrepancies between OML estimates and known values from the simulations. The combination of these models leads to a significant improvement in the prediction skill for the parame

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