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A simple analysis method for the I-V curve of Single Langmuir Probes IKJIN CHOI, CHIN-WOOK CHUNG, Department of Electrical Engineering, Hanyang University, Republic of Korea — In single Langmuir probes, the derivation of the electron temperatures from I-V characteristics is not easy and simple because of the difficulties in obtaining ion currents. The electron temperatures are usually found from a logarithm slope of the electron current that the ion current was subtracted from the probe current. In this paper, a simple method regardless of ion currents will be introduced and demonstrated. If electrons are in a Maxwellian distribution, the electron temperature is simply given by $I_p / (dI_p/dV)$ at a plasma potential where I_p and V are the probe current and the bias voltage. In this case, ion current theories were not needed because the ion current becomes zero at the plasma potential. The electron temperatures from this method are used to derive plasma densities from electron saturation currents. This simple analysis was in good agreement with that from the electron energy distribution measurement when the electron distribution was a Maxwellian. This analysis was applied in Bi-Maxwellian electron distributions and some discussion will be presented.

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