Analytic evaluation of the weighting functions for remote sensing of blackbody planetary atmospheres: The case of limb viewing geometry

E. Ustinov

Jet Propulsion Laboratory, California Institute of Technology, California, USA
(Eugene.A.Ustinov@jpl.nasa.gov / Fax: +1 818-3934619 Phone: +1 818-3542048)

In a recent publication (Ustinov, 2002), we proposed an analytic approach to evaluation of radiative and geophysical weighting functions for remote sensing of a blackbody planetary atmosphere, based on general linearization approach applied to the case of nadir viewing geometry. In this presentation, the general linearization approach is applied to the limb viewing geometry. The expressions, similar to those obtained in (Ustinov, 2002), are obtained for weighting functions with respect to the distance along the line of sight. Further on, these expressions are converted to the expressions for weighting functions with respect to the vertical coordinate in the atmosphere. Finally, the numerical representation of weighting functions in the form of matrices of partial derivatives of grid limb radiances with respect to the grid values of atmospheric parameters is used for a convolution with the finite field of view of the instrument.