551.593.53 : 551.521.63

Appendix to "Studies of the Distribution of Ultraviolet Sky Radiation (III)"*

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In regard to the approximate calculation of the formulae of radiative equilibrium in a scattering atmosphere CHANDRASEKHAR [1], [2] gave an extensive numerical table of the function including an exponential integral as an integrand. As some of the formulae of this author also include the same function, it will be convenient to modify the formulae using the same notation as CHANDRASEKHAR. That is, using the relation $F_{j+1}(\tau_1, \mu)=\int_0^{\tau_1} e^{t/\mu}E_{j+1}(\tau)dt$, the formulae (15 a), (15 b) and (15 c) in p. 102 can be rewritten as follows:

$$(15\,a)' \quad Ln(s, a, \mu_1, \mu_2, z, m)=e^{-s\overline{m}\sec z}\left\{\frac{1}{s}F[s\overline{m}, \cos z]+\left(\frac{1}{s}-\frac{1}{a+s}\right)\right.$$
$$\times F[s(m-\mu_1), -\cos z]-\left(\frac{1}{s}-\frac{1}{a+s}\right)F[a(\mu_1-\mu_2)+s(m-\mu_2), -\cos z]$$
$$\left.+\frac{1}{s}F[sm+a(\mu_1-\mu_2), -\cos z]\right\} \qquad 1>m>\mu_1$$

$$(15\,b)' \quad Ln(s, a, \mu_1, \mu_2, z, m)=e^{-\{a(\mu_1-m)+s\overline{m}\}\sec z}\left\{\frac{1}{s}F[a(\mu_1-m)+s\overline{m}, \cos z]\right.$$
$$-\left(\frac{1}{s}-\frac{1}{a+s}\right)F[(a+s)(\mu_1-m), \cos z]-\left(\frac{1}{s}-\frac{1}{a+s}\right)$$
$$\left.\times F[a+s)(m-\mu_2), -\cos z]+\frac{1}{s}F[a(m-\mu_2)+sm, -\cos z]\right\} \quad \mu_1>m>\mu_2$$

$$(15\,c)' \quad Ln(s, a, \mu_1, \mu_2, z, m)=e^{-\{a(\mu_1-\mu_2)+s\overline{m}\}\sec z}\left\{\frac{1}{s}F[a(\mu_1-\mu_2)+s\overline{m}, \cos z]\right.$$
$$-\left(\frac{1}{s}-\frac{1}{a+s}\right)F[a(\mu_1-\mu_2)+s(\mu_1-m), \cos z]+\left(\frac{1}{s}-\frac{1}{a+s}\right)$$
$$\left.\times F[s(\mu_2-m), \cos z]+\frac{1}{s}F[sm, -\cos z]\right\} \qquad \mu_2>m>0$$

References

[1] SEKIHARA, K., 1952: Studies of the Distribution of Ultraviolet Sky Radiation (III). Pap. Met. Geophys. 3, p. 94.

[2] CHANDRASEKHAR, S., 1950: Radiative Transfer, p. 203, Oxford, Univ. Press.

[3] ———— », 1948: Astrophysical Journal, 108, p. 92.

———— », 1949: » 109, p. 555.

* From the paper of SEKIHARA [1]

Errata (Vol. III)

Page	Line	For	Read
99	16 (Eq. 12a)	$\int_{\mu_1}^{1} e^{-sm\sec\theta} e^{-s\bar{m}\sec\theta} dm$	$\int_{\mu_1}^{1} e^{-sm\sec\theta} e^{-s\bar{m}\sec z} dm$
100	5 (Eq. 13)	$\dfrac{e^{(a+s)\bar{\mu}_2(\sec\theta-\sec z)} - e^{(a+s)\bar{\mu}_1(\sec\theta-\sec z)}}{(\sec\theta-\sec z)}$	$\dfrac{\quad\text{,,}\quad}{(a+s)\,(\sec z-\sec\theta)}$
102	12 (Eq. 15b)	$\dfrac{1}{s}\int_0^{s\mu_2} e^{-\{s\bar{\mu}_2+\cdots\}\sec z}$	$\dfrac{1}{s}\int_0^{s\mu_2} e^{-\{s\bar{\mu}_1+\cdots\cdots\}\sec z}$ .....
103	3 (Eq. 16b)	$\int_{\mu_1}^{1} e^{-\{s\mu_2+(a+s)(\mu_1-\mu_2)+sm\}\sec\theta}$	$\int_{\mu_1}^{1} e^{-\{s\mu_2+(a+s)(\mu_1-\mu_2)+s(m-\mu_1)\}\sec\theta}$ .....