Erratum

Corrigenda to "A simplified implementation of the discrete-ordinates method for a class of problems in radiative transfer with polarization" [J Quant Spectrosc Radiat Transfer 2011;112:2801–13]

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A few corrections are needed in the aforementioned work. First of all, Section 3 should have started with "In the manner of Ref. [6], ...". Secondly, the definition of $\mathbf{\Phi}_-(v_j)$, one of the vectors of elementary solutions given by Eq. (22), was written in an incorrect way. And so, Eq. (22) of [1] is to be replaced with the following equations (see [2]):

$$\mathbf{\Phi}_+(v_j) = \begin{pmatrix} \mathbf{\Phi}(v_j,\mu_1) \\ \mathbf{\Phi}(v_j,\mu_2) \\ \vdots \\ \mathbf{\Phi}(v_j,\mu_N) \end{pmatrix} \tag{22a}$$

and

$$\mathbf{\Phi}_-(v_j) = \begin{pmatrix} \mathbf{D}\mathbf{\Phi}(v_j,-\mu_1) \\ \mathbf{D}\mathbf{\Phi}(v_j,-\mu_2) \\ \vdots \\ \mathbf{D}\mathbf{\Phi}(v_j,-\mu_N) \end{pmatrix}, \tag{22b}$$

where $\mathbf{D} = \mathrm{diag}\{1,1,-1,-1\}$. A couple of additional equations were affected by the incorrect definition of $\mathbf{\Phi}_-(v_j)$ in [1]: Eq. (34) is to be replaced with

$$\mathbf{S}_+(v_j) = \sum_{n=1}^{N} w_n \mu_n \mathbf{\Phi}(v_j,\mu_n) \tag{34a}$$

and

$$\mathbf{S}_-(v_j) = \sum_{n=1}^{N} w_n \mu_n \mathbf{D}\mathbf{\Phi}(v_j,-\mu_n), \tag{34b}$$

and Eq. (37) is to be replaced with

$$\mathbf{G}_+(v_j) = \sum_{n=1}^{N} w_n \mathbf{P}_l^m(\mu_n) \mathbf{\Phi}(v_j,\mu_n) \tag{37a}$$

and

$$\mathbf{G}_-(\nu_j) = \sum_{n=1}^{N} w_n \mathbf{P}_l^m(\mu_n) \mathbf{D}\mathbf{\Phi}(\nu_j, -\mu_n). \qquad (37b)$$

Finally, Eq. (32b) of [1] has incorrect spatial arguments in the C and S functions and should be corrected as follows:

$$\mathbf{I}(\tau, -\mu) = \mathbf{I}(\tau_0, -\mu)e^{-(\tau_0 - \tau)/\mu} + \frac{\varpi}{2}\mathbf{D}\sum_{j=1}^{4N} \nu_j[A_j\mathbf{T}_-(\nu_j, \mu)e^{-\tau/\nu_j}S(\tau_0 - \tau : \nu_j, \mu) + B_j\mathbf{T}_+(\nu_j, \mu)C(\tau_0 - \tau : \nu_j, \mu)]. \qquad (32b)$$

A final remark: The computer program used to generate the numerical results tabulated in [1] was based on the correct equations that are presented in this corrigenda. Therefore, the numerical results reported in Tables 2–18 of [1] remain valid.

References

[1] Garcia RDM, Siewert CE. A simplified implementation of the discrete-ordinates method for a class of problems in radiative transfer with polarization. J Quant Spectrosc Radiat Transfer 2011;112:2801–13.
[2] Siewert CE. A discrete-ordinates solution for radiative-transfer models that include polarization effects. J Quant Spectrosc Radiat Transfer 2000;64: 227–54.