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This article [*Opt. Eng.* **52**(6), 061304 (2013)] was originally published online on 7 January 2013 with an error in the numerator of Eq. (13) that propagated into Eqs. (14), (15), and (17). The corrected Eq. (13) and subsequent equations are given here:

$$r_{\mathrm{ref}} = \frac{r_2 + \frac{D_m G_0 - D_0 G_m}{G_m T_{\mathrm{ref}} + G_0}(T_{\mathrm{ref}} - T_{\mathrm{fpa}})}{\frac{G_m T_{\mathrm{fpa}} + G_0}{G_m T_{\mathrm{ref}} + G_0}} \tag{13}$$

$$r_{\mathrm{ref}} = \frac{r_2 + \frac{D_m G_0 - D_0 G_m}{G_m T_{\mathrm{ref}} + G_0}(T_{\mathrm{ref}} - T_{\mathrm{fpa}})}{\frac{G_0 + G_m T_{\mathrm{fpa}} + G_m T_{\mathrm{ref}} - G_m T_{\mathrm{ref}}}{G_m T_{\mathrm{ref}} + G_0}} \tag{14}$$

$$r_{\mathrm{ref}} = \frac{r_2 + \frac{D_m G_0 - D_0 G_m}{G_m T_{\mathrm{ref}} + G_0}(T_{\mathrm{ref}} - T_{\mathrm{fpa}})}{1 - \frac{G_m}{G_m T_{\mathrm{ref}} + G_0}(T_{\mathrm{ref}} - T_{\mathrm{fpa}})} \tag{15}$$

$$b = \frac{D_m G_0 - D_0 G_m}{G_m T_{\mathrm{ref}} + G_0}. \tag{17}$$

There was also a separate error that led to a singular matrix in Eqs. (24) and (25). The cause was an oversimplification of the method used to derive the correction coefficients, in which only one blackbody temperature was used instead of the two or more that are required to make Eq. (24) nonsingular so that it can be inverted. In the following, we provide a corrected version of Sec. 4 that removes this singular matrix. This discussion replaces the original Sec. 4 through Eq. (25):

4 Determining the Correction Coefficients

Rewriting the reference-temperature response function from Eq. (1) as

$$r_{\mathrm{ref}} - r_2 = r_{\mathrm{ref}} m \Delta T + b \Delta T \tag{19}$$

allows us to write an equation for determining the coefficients m and b. These correction coefficients can be determined by viewing two constant-temperature blackbody scenes with radiances L_1 and L_2, each with the camera at a minimum of two different temperatures, T_{fpa1} and T_{fpa2}. A third camera temperature T_{fpa3} can be experienced while viewing the second scene, but there must be at least one common FPA temperature between the two blackbody scenes. Thus we must consider the following responses: r_1 with the camera at T_{fpa1} and the blackbody at radiance L_1; r_2 with the camera at T_{fpa2} and the blackbody at radiance L_1; r_3 with the camera at T_{fpa1} and the blackbody at radiance L_2, and r_4 with the camera at T_{fpa3} and the blackbody at radiance L_2. The camera responses r_1 and r_3 are at the same FPA temperature and will be used as the references. Further, note that the responses r_2 and r_4 can be at the same FPA temperature, but this is not required (T_{fpa2} could equal T_{fpa3}). Using T_{fpa1} as the reference camera temperature leads to the following differences:

$$\Delta r_{12} = r_1 - r_2 \quad \text{and} \quad \Delta T_{12} = T_{\mathrm{fpa1}} - T_{\mathrm{fpa2}} \tag{20}$$

$$\Delta r_{34} = r_3 - r_4 \quad \text{and} \quad \Delta T_{34} = T_{\mathrm{fpa3}} - T_{\mathrm{fpa4}}. \tag{21}$$

These differences can be used in Eq. (19) to write the following matrix equation:

$$\begin{bmatrix} \Delta r_{12} \\ \Delta r_{34} \end{bmatrix} = \begin{bmatrix} r_1 \Delta T_{12} & \Delta T_{12} \\ r_3 \Delta T_{34} & \Delta T_{34} \end{bmatrix} \begin{bmatrix} m \\ b \end{bmatrix}, \tag{22}$$

which can be inverted to obtain m and b.

$$\begin{bmatrix} m \\ b \end{bmatrix} = \begin{bmatrix} r_1 \Delta T_{12} & \Delta T_{12} \\ r_3 \Delta T_{34} & \Delta T_{34} \end{bmatrix}^{-1} \begin{bmatrix} \Delta r_{12} \\ \Delta r_{34} \end{bmatrix}. \tag{23}$$

This method is the minimal approach to deriving these coefficients, but in practice we use a large range of blackbody temperatures (for example 10°C to 60°C in steps of 10°C) and a large range of camera FPA temperatures (for example from 10°C to 30°C). This can be accomplished by placing the camera in an environmental chamber and changing the ambient temperature to drive the temperature of the camera while the blackbody remains constant, then changing the blackbody temperature and repeating the ambient temperature cycle. Doing this generates multiple reference responses, one for each combination of blackbody temperature and FPA temperature, leading to an over-determined matrix as shown in Eq. (24):

$$\begin{bmatrix} \Delta r_{12} \\ \vdots \\ \Delta r_{jk} \end{bmatrix} = \begin{bmatrix} r_1 \Delta T_{12} & \Delta T_{12} \\ \vdots & \vdots \\ r_j \Delta T_{jk} & \Delta T_{jk} \end{bmatrix} \begin{bmatrix} m \\ b \end{bmatrix}. \tag{24}$$

In such a case, a pseudo-inversion is required, and in practice the Moore-Penrose pseudo-inversion is performed. This leads to a least-squares approach that reduces noise in the estimation of m and b through Eq. (25):

$$\begin{bmatrix} m \\ b \end{bmatrix} = \begin{bmatrix} r_1 \Delta T_{12} & \Delta T_{12} \\ \vdots & \vdots \\ r_j \Delta T_{jk} & \Delta T_{jk} \end{bmatrix}^{-1} \begin{bmatrix} \Delta r_{12} \\ \vdots \\ \Delta r_{jk} \end{bmatrix}. \tag{25}$$

The paper was corrected online on 25 October 2013.