Errata

Errata for "Phase-Based Block Matching Applied to Motion Estimation with Unconventional Beamforming Strategies"

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ON page 948 of the original publication of this paper [1], several phi characters "ϕ" were inadvertently switched to their alternate form "φ" during production. The corrected text follows.

Let us denote by $\phi_1(x_1, x_2)$ and $\phi_2(x_1, x_2)$ the phase differences between the same type of complex signals corresponding to signal s_1 and to signal s_2.

$$\begin{aligned}
\phi_1(x_1, x_2) &= \phi_{s11}(x_1, x_2) - \phi_{s21}(x_1, x_2) \\
\phi_2(x_1, x_2) &= \phi_{s12}(x_1, x_2) - \phi_{s22}(x_1, x_2).
\end{aligned} \tag{12}$$

Taking into account the equations in (11) and (12) and using elementary calculations, the form of the 2 phase differences ϕ_1 and ϕ_2 is obtained.

$$\begin{aligned}
\phi_1(x_1, x_2) &= 2\pi f_1 d_{m1} + 2\pi f_2 d_{m2} \\
\phi_2(x_1, x_2) &= -2\pi f_1 d_{m1} + 2\pi f_2 d_{m2}
\end{aligned}. \tag{13}$$

Note that at this stage the entire definition interval of signals s_1 and s_2 is used. Therefore, the 4 phases in (11) are not linear for this entire interval, but present phase jumps.

We observe that ϕ_1 and ϕ_2 do not depend on the spatial variables x_1 and x_2. Thus, the 2 phase differences are assumed to be constant on the entire definition interval of signals s_1 and s_2. This allows us to easily eliminate x_1 and x_2 values corresponding to phase jumps. Knowing the 2 frequencies f_1 and f_2 and considering that the spatial shifts between the 2 signals are smaller than half their period, we can easily threshold ϕ_1 and ϕ_2 to eliminate phase jumps. Let us denote by Ω the definition domain of positions x_1 and x_2 obtained after these thresholds are applied to ϕ_1 and ϕ_2. Moreover, we note the mean values of ϕ_1 and ϕ_2 on domain Ω by $\bar{\phi}_1$ and $\bar{\phi}_2$. Using these 2 mean values, the 2 equations in (13) can be written as follows:

$$\begin{pmatrix} \bar{\phi}_1 \\ \bar{\phi}_2 \end{pmatrix} = \begin{pmatrix} 2\pi f_1 & 2\pi f_2 \\ -2\pi f_1 & 2\pi f_2 \end{pmatrix} \begin{pmatrix} d_{m1} \\ d_{m2} \end{pmatrix}. \tag{14}$$

REFERENCES

[1] A. Basarab, P. Gueth, H. Liebgott, and P. Delachartre, "Phase-based block matching applied to motion estimation with unconventional beamforming strategies," *IEEE Trans. Ultrason. Ferroelectr. Freq. Control*, vol. 56, no. 5, pp. 945–957, 2009.