Errata v.5.1 for Tracking and Data Fusion: A Handbook of Algorithms
Yaakov Bar-Shalom, Peter K. Willett and Xin Tian (YBS Publishing 2011)
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- p. 23, item 2: Replace “The sigma points” by “The preliminary sigma points”
- p. 23, in Eqs. (1.4.5-11)–(1.4.5-13): Replace $x_i(k + 1|k)$ by $\hat{x}_i(k + 1|k)$
- p. 23, after (1.4.5-13) add: New (and final) sigma points $x_i(k + 1|k)$ have to be calculated based on the mean (1.4.5-12) and covariance (1.4.5-13). Note that only the final sigma points include the process noise covariance; not carrying out this recalculation of the sigma points amounts to ignoring the process noise in the measurement prediction sigma points (1.4.5-14). This omission is apparently quite common in the literature and can be also found in Sec. 2.4.1 of [Ristic04]. See also [Wu2005] for a discussion of the nonaugmented UKF (discussed here) vs. augmented UKF (the original one, presented in [Julier04]).
- p. 37, Equation (1.4.9-5): $z$ should be $Z$
- p. 37, add after Equation (1.4.9-5): This implies that the pdf of the observations conditioned on $x$, $p(Z|x)$ [or “parameterized by $x$"], as is the custom terminology in the mathematical/statistical literature, belongs to the exponential family.
- p. 37, paragraph –2 (from bottom), add: An additional regularity condition is needed, namely, the interchangeability between the differentiation with respect to $x$ and the expectation integral over $Z$ that reflects the estimator’s unbiasedness condition (Equation (2.7.3-2) in [Bar-Shalom01]).
- p. 53, 1.3, under Design Guidelines: “rad/s” should be “mrad/s”
- p. 55: Equation (1.6.2-4) should be replaced by

$$\alpha = \begin{cases} 
\tan^{-1}(y/x) & \text{or} \quad \pi/2 - \tan^{-1}(x/y) \quad x > 0, y > 0 \\
\pi + \tan^{-1}(y/x) & \text{or} \quad \pi/2 - \tan^{-1}(x/y) \quad x < 0, y > 0 \\
\pi + \tan^{-1}(y/x) & \text{or} \quad 3\pi/2 - \tan^{-1}(x/y) \quad x < 0, y < 0 \\
2\pi + \tan^{-1}(y/x) & \text{or} \quad 3\pi/2 - \tan^{-1}(x/y) \quad x > 0, y < 0 
\end{cases} \quad (1)$$

where the second option should be used when $|y/x| > 1$ to avoid angles with very large tangents; $\tan^{-1}$ is the principal value in $[\pi/2, \pi/2]$. This yields the azimuth counterclockwise from the $x$-axis and in the range $[0, 2\pi]$.
- p. 109 after Eq. (2.3.2-5): $3\pi/4$ should be $4\pi/3$.
- pp. 121, 143 and 149: The citation [PAP] (which leads to a blank entry in the bibliography) should be [Papoulis02].
- p. 115: The heading of Subsection 2.4.4 should not be all caps.
- p. 132, line 3 in Subsec. 2.6.4: The citation [Bar-Shalom95] should be [Bar-Shalom01].
- p. 149: The last two paragraphs pertain to Sec. 3.3 and should be replaced by “Sec. 2.6 is based on [Bar-Shalom02], [Bar-Shalom04] and [Bar-Shalom05a], which contain the derivations of the OOSM algorithms discussed.”
- p. 164 line 2: “Sec. 2.2” should be “Sec. 3.3.2”.
- p. 185, in Equation (3.5.3-33): $S(k)^{-1}$ should be $S(k)$.
- p. 215 in (3.8.4-10): $(R(k)^{-1}$ should be $R(k)^{-1}$.
- p. 354, Figure 5.4.2-2: the equation for $\mu_F$ should have denominator $m(k)!$ rather than $m(k)$.
- p. 363, Footnote 2: the second sentence should read “Since $m_k = 0$ will be seen not to contribute to the bound ...”
- p. 375, Subsubsection “The CRLB vs. System Parameters”: the first sentence should read “The values of the IRF, $q_2$, are obtained via the Monte Carlo ...”
- p. 383, Above Figure 5.6.6-1: An awkward placement of a single word at the top of the page that belongs to p. 381
- p. 447, Footnote 9: The word “originating” should appear only once.
- p. 577: In Equation (8.6.2-5) replace $k - 1$ by $k - l$.
- p. 581: Equation (9.2.2-5) is erroneously referred to as the normalized distance squared (eq. (9.2.2-5) is neither normalized, nor squared); this label should instead apply to $D$ of equation (9.2.2-8).
• p. 582: In Equation (9.2.2-10) the subscript \( n_z \) should be \( n_x \).

• p. 595, Paragraph 1: the reference to Fig. 9.4.4-1 should instead be Fig. 9.4.4-3.

• p. 640, Section 9.7.3: the list is numbered intentionally from 0 (this is because of a peculiarity of the network which could have been avoided).

• p. 648, Subsubsection “Sequential \( m \)-best 2-D Assignment”: a footnote should be added after “\((Sm2D)\)” stating “This should be called \( m \)-b 2D + seq 2D”.

• p. 650, Paragraph 3, Sentence 2: “This makes the algorithm run only once. . .”

• p. 800, Paragraph 3, Sentence 1: “. . . in (12.4.5-3); see also Section 1.6.4.”

• p. 849 Fig. 13.6.3-3 should be replaced by

![Figure 1: The estimated centroid velocity along with \( \pm 1\sigma \) accuracy.](image)

• p. 831: In Eq. (13.4.5-1) replace the last \( k \) by \( k - 1 \).

• p. 885, second to last paragraph, line 2: “an unique” should be “a unique”

• p. 1132, Section 16.3.4, paragraph 2: The final sentence should read “The standard deviations of the measurement noises are . . .”

• p. 1134, Figure 16.3.4-2: The caption should read “Range bias RMS errors . . .”

• p. 1141: In Section 16.4.2, just after (16.4.2-6): The reference to Subsection 16.5 should instead be referenced to Subsection 16.4.5.

• p. 1209: The entry [PAP] should be eliminated.

**Additional Bibliography**
