updated on June 13, 2008

Corrigenda for "Very Long Baseline Interferometer"

Chapter 3

Page 53 : Misprint in the 1st line of formula (3.42)

Error ds

Corrected dx

Page 53 : Misprint in the 2nd line of formula (3.42)

Error $\left[x(-\sigma_x^2 e^{-\frac{x^2}{2\sigma_x^2}}\right]_0^\infty$

Corrected $\left[x\left(-\sigma_x^2 e^{-\frac{x^2}{2\sigma_x^2}}\right)\right]_0^\infty$

Page 53 : Misprint in the 2nd line (equation in a text line) under formula (3.42)

Error ds

Corrected dx

Page 53 : Misprint in the 2nd line below formula (3.45)

Error that is dependent on

Corrected that is independent on

Page 60 In Fig.3.10, '+N' at lower right corner should be 'tN'

Page 63 Misprint in the equation just above eq.(3.76)

Error $\left|X_j - S_j e^{-i2\pi f_j \tau}\right|^2$

Corrected $\left|Y_j - S_j e^{-i2\pi f_j \tau}\right|^2$

Page 64 Missing coefficient in the equation of the 1st line

Error $-|S_j|^2 + \Re[S_j Z_j] =$

Corrected $-|S_j|^2 + 2\Re[S_j Z_j] =$

Page 64 : The misprint in numerator of the 1st line in Eq.(3.80)

Error $\prod_{j=1}^{N} \frac{1}{(2\pi)^2 \sigma_{sj}^2 \sigma_{nxj}^2 \sigma_{nyj}^2}$

Corrected $\prod_{j=1}^{N} \frac{\sigma_j^2}{(2\pi)^2 \sigma_{sj}^2 \sigma_{nxj}^2 \sigma_{nyj}^2}$

Page 65 : The misprint in the 1st line in Eq.(3.86)

Error $C_{xy} = \sqrt{T_{ax} T_{ay} |s(f)|^2} e^{i2\pi f \tau_g}$

Corrected $C_{xy} = \sqrt{T_{ax} T_{ay}}\ \overline{|s(f)|^2} e^{i2\pi f \tau_g}$

Page 65 : The misprint in the 1st term of the 3rd line in Eq.(3.85)

Error $\sqrt{T_{ny} T_{ax}} n_x(f) s'^*(f) +$

Corrected $\sqrt{T_{nx} T_{ay}} n_x(f) s'^*(f) +$

Page 68 : The misprint in the equation in the line just above the eq.(3.105)

Error $s'^{*}(f) = s^{*} e^{2\pi f \tau_g}$

Corrected $s'^{*}(f) = s^{*}(f) e^{2\pi f \tau_g}$

Page 69 : Misprints in the 4th and 5th lines in eq.(3.109).

Error
$$= \frac{\sqrt{T_{ax}T_{ay}}}{2\pi(\tau+\tau_g)}[\sin\{2\pi f(\tau+\tau_g) + 2\pi f_0 \tau_g + \theta\}]_0^B$$
$$= \frac{\sqrt{T_{ax}T_{ay}}}{2\pi(\tau+\tau_g)}[\sin\{2\pi B(\tau+\tau_g) + 2\pi f_0 \tau_g + \theta\}$$

Corrected
$$= \frac{2\sqrt{T_{ax}T_{ay}}}{2\pi(\tau+\tau_g)}[\sin\{2\pi f(\tau+\tau_g) + 2\pi f_0 \tau_g + \theta\}]_0^B$$
$$= \frac{\sqrt{T_{ax}T_{ay}}}{\pi(\tau+\tau_g)}[\sin\{2\pi B(\tau+\tau_g) + 2\pi f_0 \tau_g + \theta\}$$

Page 78 : The misprint in a formula (3.124) (Note that the correction in corrigenda on May 10, 2008 and before was wrong!).

Error $X_i(f) = \frac{1}{2}\big[e^{i\phi_0}X(f-f_r) + e^{-i\phi_0}X(f+f_r)\big]$

Corrected $X_i(f) = \frac{1}{2}i\big[-e^{i\phi_0}X(f-f_r) + e^{-i\phi_0}X(f+f_r)\big]$

Pages 78-79 : All τ of the portion which serves as τdf in formula (3.127) - (3.130) must be contained in the shoulder of exponential.
eq.(3.127)

Error $R_r(\tau) = \int \big[X_r(f)\cdot Y^{*}(f)\big]e^{i2\pi f}\tau df$

Corrected $R_r(\tau) = \int \big[X_r(f)\cdot Y^{*}(f)\big]e^{i2\pi f\tau} df$

eq.(3.128)

Error $R_i(\tau) = \int \big[X_i(f)\cdot Y^{*}(f)\big]e^{i2\pi f}\tau df$

Corrected $R_i(\tau) = \int \big[X_i(f)\cdot Y^{*}(f)\big]e^{i2\pi f\tau} df$

eq.(3.129)

Error $U(\tau) = \int \big[X(f-f_r)e^{i\phi_0}\cdot Y^{*}(f)\big]e^{i2\pi f}\tau df$

Corrected $U(\tau) = \int \big[X(f-f_r)e^{i\phi_0}\cdot Y^{*}(f)\big]e^{i2\pi f\tau} df$

eq.(3.130), above correction plus signs in shoulders of e

Error $L(\tau) = \int \big[X(f+f_r)e^{i\phi_0}\cdot Y^{*}(f)\big]e^{-i2\pi f}\tau df$

Corrected $L(\tau) = \int \big[X(f+f_r)e^{-i\phi_0}\cdot Y^{*}(f)\big]e^{i2\pi f\tau} df$

Page 79 : There is a misprint in eq.(3.133)

Error $R(\tau) = R_r(\tau) \pm R_i(\tau)$

Corrected $R(\tau) = R_r(\tau) \pm iR_i(\tau)$

Page 91 : Since the definition formula (3-158) of a fine delay search function is expression which causes misapprehension, it corrects as follows.

Error $D(\Delta\tau, \Delta\dot{\tau}) = \frac{1}{K}\sum_{k=1}^{K}\left[\frac{1}{N}\sum_{n=1}^{N} D_s(n,k) e^{-i(2\pi f_0^n \Delta\tau + \Delta\phi_n)}\right] e^{-i2\pi f_0^n \Delta\dot{t}\Delta tk}$

Corrected $D(\Delta\tau, \Delta\dot{\tau}) = \frac{1}{N}\sum_{n=1}^{N}\left[\frac{1}{K}\sum_{k=1}^{K} D_s(n,k) e^{-i(2\pi f_0^n \Delta\dot{\tau}\Delta tk + \Delta\phi_n)}\right] e^{-i2\pi f_0^n \Delta\tau}$

In connection with this correction, the sentence of the 2nd line under a formula (3.159) at page 91 is corrected as follows,

Error 'The bracket terms in eq.(3.158) represent ....'

Corrected 'The outside of bracket terms in eq.(3.158) represents ...'

Furthermore, the sentence of the 4th line on page 92 is corrected as follows,

Error '... , the bracket portion of eq.(3.158) can be ...'

Corrected '... , the right side of eq.(3.158) can be ....'

Moreover, a formula (3-160) is corrected as follows,

Error

$$
\begin{aligned}
&\frac{1}{N}\sum_{n=1}^{N} D_s(n,k) e^{-i(2\pi f_0^n \Delta\tau + \Delta\phi_n} \\
&= e^{-i2\pi f_0^1 \Delta\tau}\left[\frac{1}{N}\sum_{n=1}^{N} D_s(n,k) e^{-i\phi_n} e^{-i2\pi(f_0^n - f_0^1)\Delta\tau}\right]
\end{aligned}
$$

Corrected

$$
\begin{aligned}
&\frac{1}{N}\sum_{n=1}^{N}\left[\frac{1}{K}\sum_{k=1}^{K} D_s(n,k) e^{-i(2\pi f_0^n \Delta\dot{\tau}\Delta tk + \Delta\phi_n)}\right] e^{-i2\pi f_0^n \Delta\tau} \\
&= e^{-i2\pi f_0^1 \Delta\tau}\left[\frac{1}{N}\sum_{n=1}^{N}\left\{D_s(n,k) e^{-i2\pi(f_0^n - f_0^1)\Delta\tau}\right\} e^{-i2\pi(f_0^n - f_0^1)\Delta\tau}\right]
\end{aligned}
$$

Page 97 : There is a misprint in Fig. 3.34. Ordinate axis name is Im not lm.

Page 100 : The misprint is in a formula (3-184).

Error $\hat{\mathbf{x}} = (\tilde{\mathbf{A}}\mathbf{W}\mathbf{A})^{-1}\tilde{\mathbf{A}}\mathbf{W}_y$

Corrected $\hat{\mathbf{x}} = (\tilde{\mathbf{A}}\mathbf{W}\mathbf{A})^{-1}\tilde{\mathbf{A}}\mathbf{W}\mathbf{y}$

Page 102 : The misprint is in a formula (3-194).

Error

$$
\begin{aligned}
\sigma_f^2 &= \frac{1}{N}\sum_{n=1} N(f_n - \bar{f})^2 \\
&= \frac{1}{N}\sum_{n=1} N(f_n^2 - 2f_n\bar{f} + \bar{f}^2) \\
&= \frac{1}{N}\left(\sum_{n=1} N f_n^2 - 2\bar{f}\sum_{n=1} N f_n + \sum_{n=1} N\bar{f}^2\right) \\
&= \frac{1}{N}\sum_{n=1} N f_n^2 - \left(\frac{1}{N}\sum_{n=1}^{N} f_n\right)^2
\end{aligned}
$$

Corrected

$$
\begin{aligned}
\sigma_f^2 &= \frac{1}{N}\sum_{n=1}^{N}(f_n - \bar{f})^2 \\
&= \frac{1}{N}\sum_{n=1}^{N}(f_n^2 - 2f_n\bar{f} + \bar{f}^2) \\
&= \frac{1}{N}\left(\sum_{n=1}^{N} f_n^2 - 2\bar{f}\sum_{n=1}^{N} f_n + \sum_{n=1}^{N}\bar{f}^2\right) \\
&= \frac{1}{N}\sum_{n=1}^{N} f_n^2 - \left(\frac{1}{N}\sum_{n=1}^{N} f_n\right)^2
\end{aligned}
$$