S.M. Iacus. Errata Corrige to the first edition of:

Iacus, S.M. (2008) *Simulation and Inference for Stochastic Differential Equations: with R examples*, Springer Series in Statistics, Springer NY, ISBN: 978-0-387-75838-1.

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Errata in Chapter 1

Where	Errata	Corrige
p:14, l:-22	$(\omega, \mathcal{A}, P)$	$(\Omega, \mathcal{A}, P)$
p:18, l:2	$(\omega, \mathcal{A}, P)$	$(\Omega, \mathcal{A}, P)$
p.30, l:-2	$\Pi_n \to 0$	$\|\|\Pi_n\|\| \to 0$
p.36, l:-3	$t \to -\infty$	$t \to \infty$
p.39, l:3	$O(\mathrm{d}t)$	$o(\mathrm{d}t)$
p.39, f. (1.30)	$\left(b_1(s) - \frac{1}{2}\sigma_1(s)\right)$	$\left(b_1(s) - \frac{1}{2}\sigma_1^2(s)\right)$
p.42, l:11	$b_1(x) = \nu$	$b_1(x) = 0$
p.42, l:12	$b_2(x) = 0$	$b_2(x) = \nu$

p.42, central formula becomes

$$\begin{aligned}
\frac{\mathrm{d}P_2}{\mathrm{d}P_1}(Y) = & \exp\left\{\int_0^1 \frac{\nu - 0}{\sigma^2}\mathrm{d}Y_s - \frac{1}{2}\int_0^1 \frac{\nu^2 - 0^2}{\sigma^2}\mathrm{d}t\right\} \\
= & \exp\left\{\frac{\nu}{\sigma^2}\int_0^1 (\nu \mathrm{d}s + \sigma \mathrm{d}W_s) - \frac{1}{2}\frac{\nu^2}{\sigma^2}\right\} \\
= & \exp\left\{\left(\frac{\nu}{\sigma}\right)^2 + \frac{\nu}{\sigma}W_1 - \frac{1}{2}\frac{\nu^2}{\sigma^2}\right\} \\
= & \exp\left\{\frac{1}{2}\left(\frac{\nu}{\sigma}\right)^2 + \frac{\nu W_1}{\sigma}\right\}.
\end{aligned}$$

p.42, script `ex1.14.R` has changed to match this errata corrige in version 2.0.7 of the `sde` package. See below:

```
# ex1.14.R -- corrected version. See errata corrige to the first edition
set.seed(123)
par("mar"=c(3,2,1,1))
par(mfrow=c(2,1))
npaths <- 30
N <- 1000
sigma <- 0.5
nu <- -0.7
X <- sde.sim(drift=expression(0),sigma=expression(0.5), pred=F, N=N,M=npaths)
```

```
Y <- X + nu*time(X)
girsanov <- exp(0.25 * (nu/sigma*X[N,] + 0.5*(nu/sigma)^2))
girsanov <- (girsanov - min(girsanov)) / diff(range(girsanov))
col.girsanov <- gray(1-girsanov)
matplot(time(X),Y,type="l",lty=1, col="black",xlab="t")
matplot(time(X),Y,type="l",lty=1,col=col.girsanov,xlab="t")
```

Errata in Chapter 3

Where	Errata	Corrige
p:175, l:-7	$f(y,x)$	$f(x,y)$
p:176, l:10	$f(y,x)$	$f(x,y)$
p:177, l:9	$f(y,x)$	$f(x,y)$

The following code for `dcKessler` had a missing square in term `Ex` in the definition of `Vx`.

```
dcKessler <- function (x, t, x0, t0, theta, d, dx, dxx, s, sx, sxx, log = FALSE){
    Dt <- t - t0
    mu <- d(t0, x0, theta)
    mu1 <- dx(t0, x0, theta)
    mu2 <- dxx(t0, x0, theta)
    sg <- s(t0, x0, theta)
    sg1 <- sx(t0, x0, theta)
    sg2 <- sxx(t0, x0, theta)
    Ex <- (x0 + mu * Dt + (mu * mu1 + 0.5 * (sg^2 * mu2)) * (Dt^2)/2)
    Vx <- (x0^2 + (2 * mu * x0 + sg^2) * Dt + (2 * mu * (mu1 *
        x0 + mu + sg * sg1) + sg^2 * (mu2 * x0 + 2 * mu1 + sg1^2 +
        sg * sg2)) * (Dt^2)/2 - Ex^2)
    Vx[Vx < 0] <- NA
    dnorm(x, mean = Ex, sd = sqrt(Vx), log = log)
}
```

Errata in Chapter 4

p:213-214, Listing 4.3. The `cpoint` function has been fixed as follows in version 2.0.5 of the `sde` package. See below.

```
function (x, mu, sigma)
{
    DELTA <- deltat(x)
    n <- length(x)
    Z <- NULL
    if (!missing(mu) && !missing(sigma)) {
        Z <- (diff(x) - mu(x[1:(n - 1)]) * DELTA)/(sqrt(DELTA) *
            sigma(x[1:(n - 1)]))
    }
    else {
        bw <- n^(-1/5) * sd(x)
        y <- sapply(x[1:(n - 1)], function(xval) {
            tmp <- dnorm(xval, x[1:(n - 1)], bw)
            sum(tmp * diff(x))/(DELTA * sum(tmp))
        })
        Z <- diff(x)/sqrt(DELTA) - y * sqrt(DELTA)
    }
```

```
    lenZ <- length(Z)
    Sn <- cumsum(Z^2)
    S <- sum(Z^2)
    D <- abs(1:lenZ/lenZ - Sn/S)
    k0 <- which(D == max(D))[1]
    return(list(k0 = k0 + 1, tau0 = time(x)[k0 + 1], theta1 = sqrt(Sn[k0]/k0),
        theta2 = sqrt((S - Sn[k0])/(lenZ - k0))))
}
```

Updated references

27. Beskos, A., Papaspiliopoulos, O., Roberts, G.O. (2006) Retrospective exact simulation of diffusion sample paths with applications, *Bernoulli*, **12**(6), 1077–1098.

28. Beskos, A., Papaspiliopoulos, O., Roberts, G.O. (2008) A Factorisation of Diffusion Measure and Finite Sample Path Constructions, *Meth. Compt. App. Prob.*, **10**(1), 85-104.

64. De Gregorio, A., Iacus, S.M. (2008) Least squares volatility change point estimation for partially observed diffusion processes, *Communications in Statistics, Theory and Methods*, **37**(15), 2342–2357.

157. Lepage, T., Law, S., Tupper, P., Bryant, D. (2006) Continuous and tractable models for the variation of evolutionary rates, *Math. Biosciences*, **199**(2), 216–233.

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