

# STPPP

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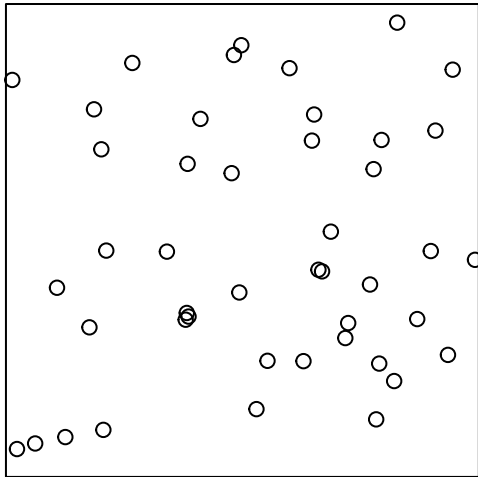
Configuração inicial: Poisson em  $[0, 1]^2$  com taxa  $\lambda = 50$ .

```
require(spatstat)

win <- owin(c(0,1),c(0,1))

set.seed(1)
x <- rpoispp(50, win = win)
plot(x)
```

**X**



Livro do Diggle (2014) sugere usar  $[0, 1]^2 \times \{0, 1, \dots, T\}$  (p. 206), isto é, tempo discreto. Em caso contrário fica muito difícil definir propriedades (função  $K$ , verossimilhança etc.).

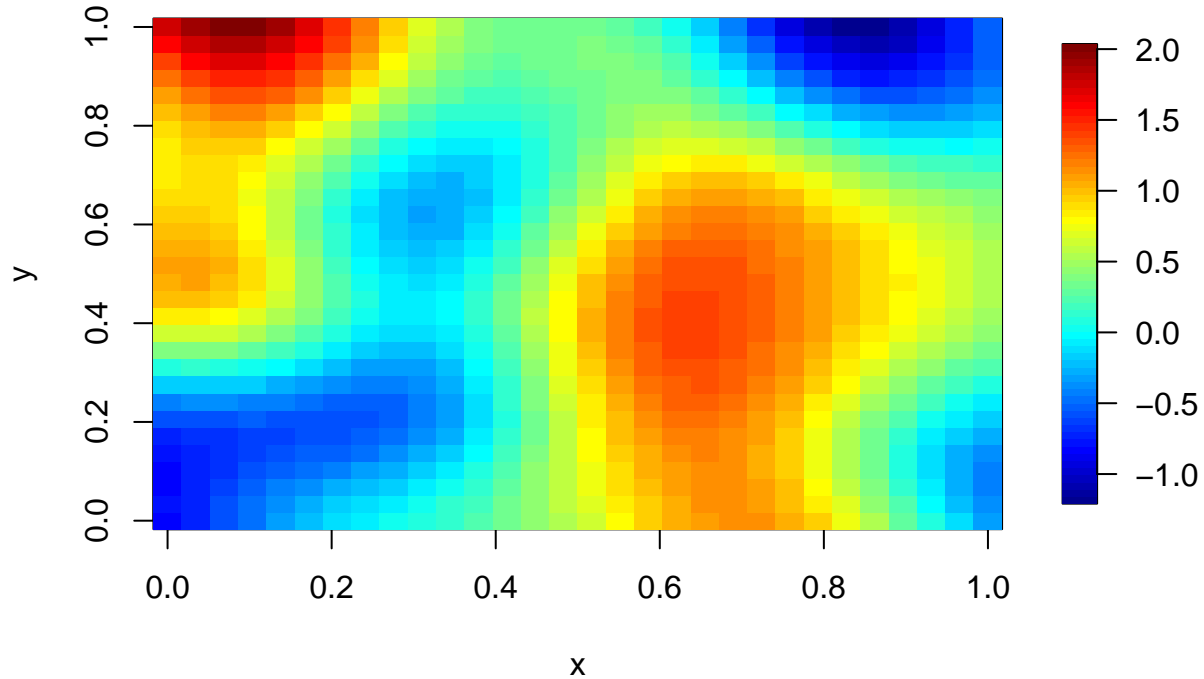
Processo Gaussiano espacial

```
require(mtvnorm)
require(fields)

x <- seq(0, 1, l=30)
y <- seq(0, 1, l=30)
tim <- 0:5
xy <- expand.grid(x=x, y=y)
G <- exp(-(as.matrix(dist(xy))^2)/.1)
temp <- eigen(G, symmetric = TRUE)
temp$values[temp$values < 0] <- 0
```

```
# temp$eigenvectors %*% diag(temp$values) %*% t(temp$eigenvectors)

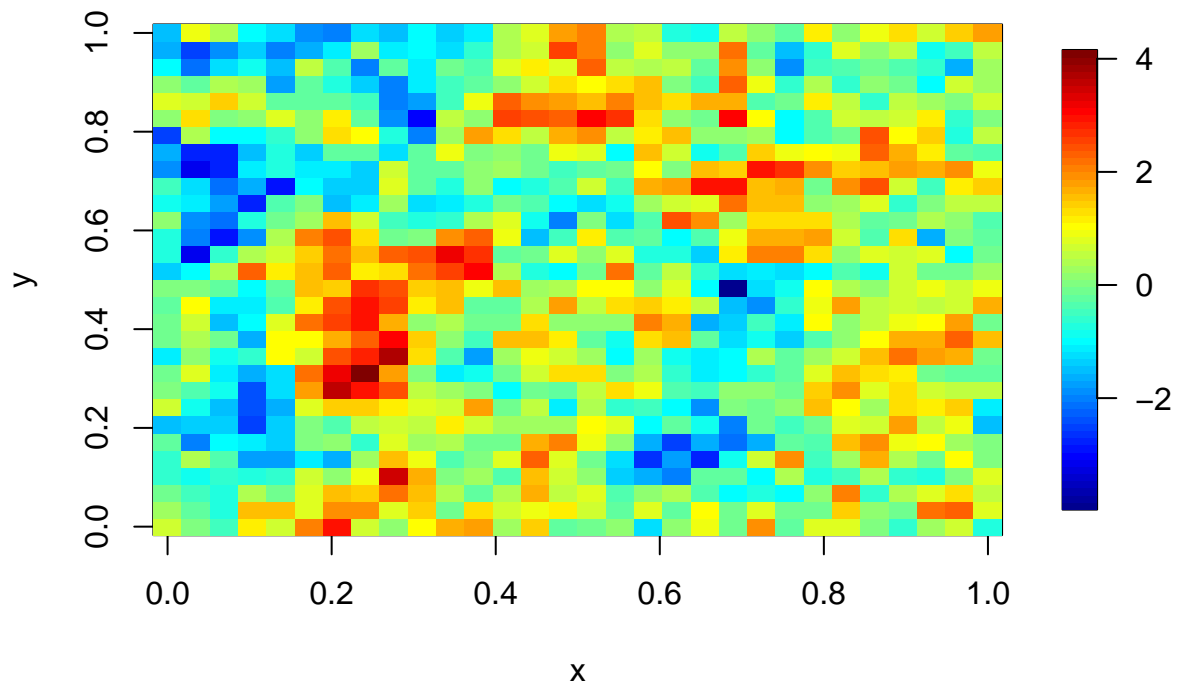
set.seed(3)
Z <- temp$eigenvectors %*% crossprod(diag(sqrt(temp$values)), rnorm(nrow(xy), 0, 1))
fields::image.plot(x, y, matrix(Z, nrow = length(x)))
```



Processo de Cox

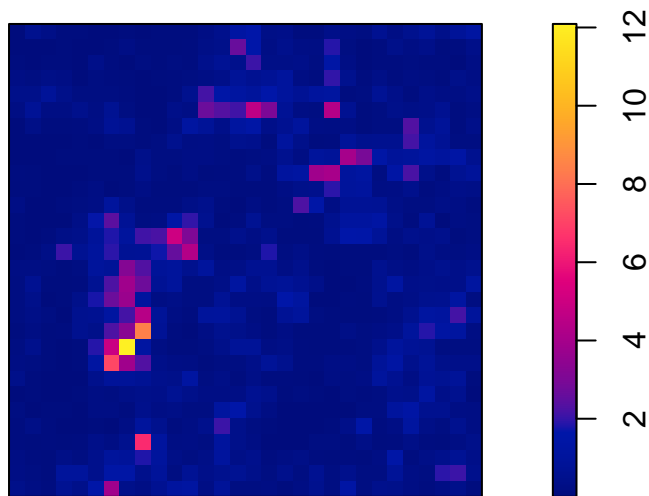
```
x <- seq(0, 1, l=30)
y <- seq(0, 1, l=30)
tim <- 0:5
xy <- expand.grid(x=x, y=y)
G <- 2*exp(-(as.matrix(dist(xy))^1)/.1) # exponencial
temp <- eigen(G, symmetric = TRUE)
temp$values[temp$values < 0] <- 0
# temp$eigenvectors %*% diag(temp$values) %*% t(temp$eigenvectors)

set.seed(3)
Z <- temp$eigenvectors %*% crossprod(diag(sqrt(temp$values)), rnorm(nrow(xy), 0, 1))
fields::image.plot(x, y, matrix(Z, nrow = length(x)))
```



```
temp2 <- as.im(t(matrix(exp(Z-1.6), nrow = length(x)))) # Precisa transpor!!!
# Como uma regressão com beta0 = -1.2
plot(temp2, main = "baseline como imagem")
```

### baseline como imagem



```
set.seed(3)
win <- owin(c(0,1),c(0,1))
x <- rpoispp(lambda = temp2, win = win)

## Warning: Argument 'win' ignored in rpoispp

plot(temp2, main = "Processo de Cox")
plot(x, pch = 20, add = TRUE)
```

## Processo de Cox

