Norwegian spruces dataset

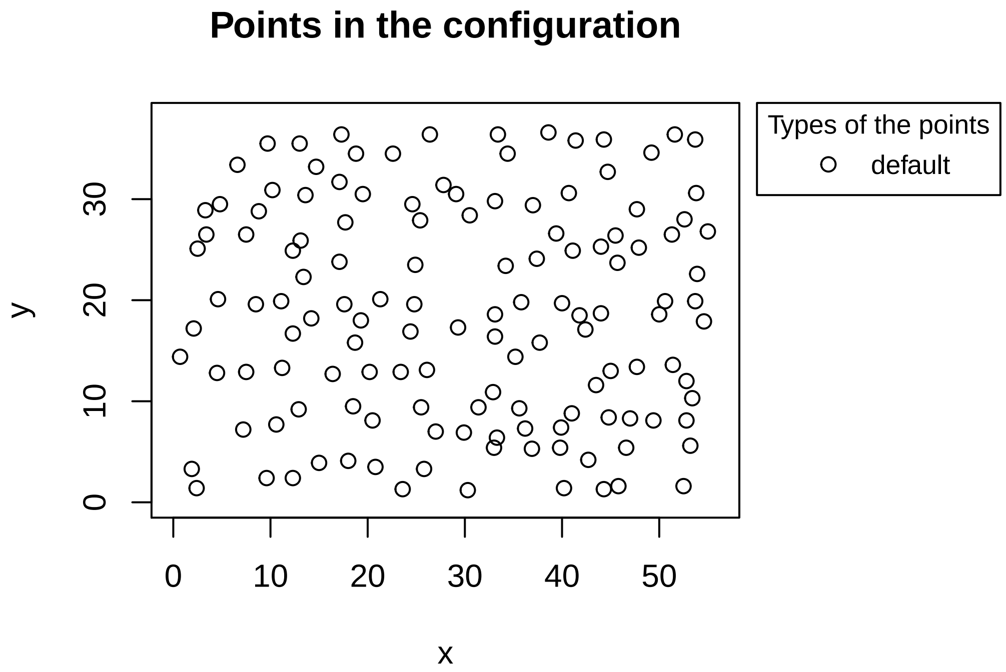
```
library(ppjsdm)
#> Registered S3 method overwritten by 'spatstat':
#>   method     from
#>   print.boxx cli
library(spatstat)
#> Loading required package: spatstat.data
#> Loading required package: nlme
#> Loading required package: rpart
#>
#> spatstat 1.63-0       (nickname: 'Space camouflage')
#> For an introduction to spatstat, type 'beginner'
remove(list = ls())

set.seed(1)
```

This vignette explains how to use the `ppjsdm` package with the `spruces` dataset from `spatstat`. We begin by loading the data with all species.

```
truncated_spruces <- spruces
# Window(truncated_spruces) <-  owin(c(3, 56), c(0, 35))
configuration <- Configuration(truncated_spruces$x, truncated_spruces$y, marks = truncated_spruces$marks
window <- Rectangle_window(c(0, 56), c(0, 38))
```

The point configuration is plotted below.

```
print(configuration)
#> An S3 object representing a configuration.
#>
#> Number of points: 134.
par(mar = c(5, 4, 4, 13) + 0.1)
plot(configuration, window = window)
```

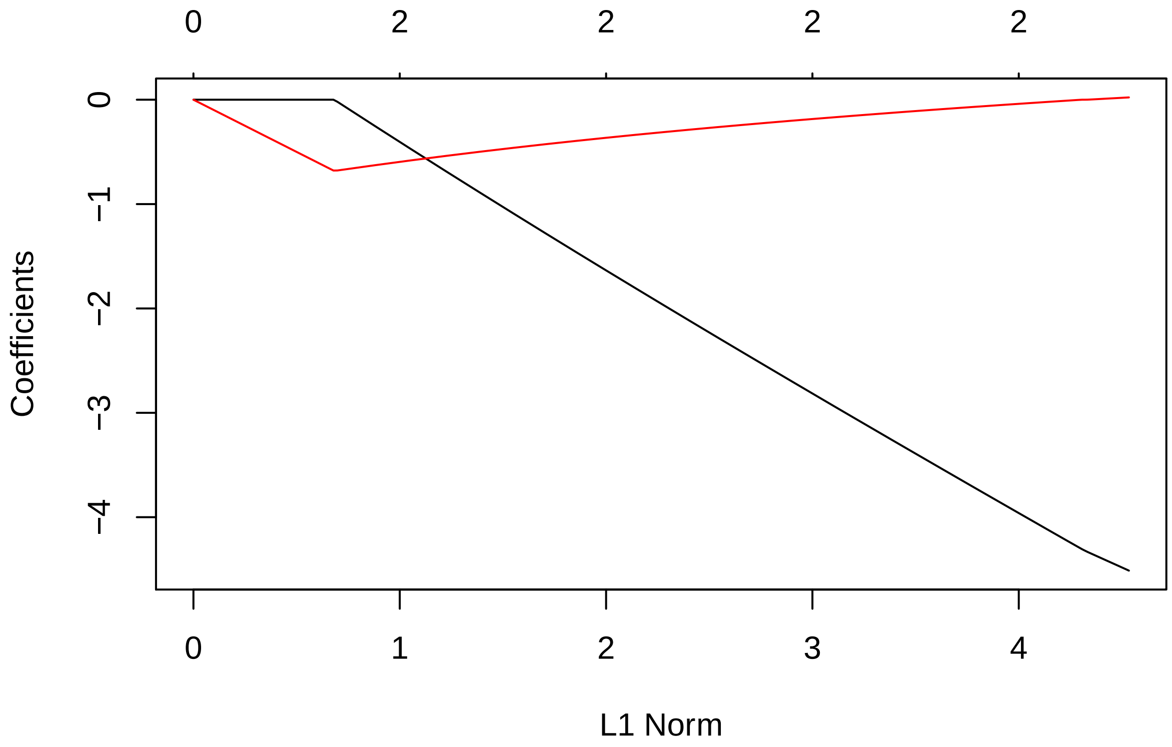


We provide a series of ranges for the interaction radii, and let the fitting function calibrate the model.

```
short_range <- c(0, 20)
medium_range <- c(0, 20)
long_range <- c(0, 20)
model <- "square_exponential"
medium_range_model <- "square_exponential"
```

We can now call the fitting function.

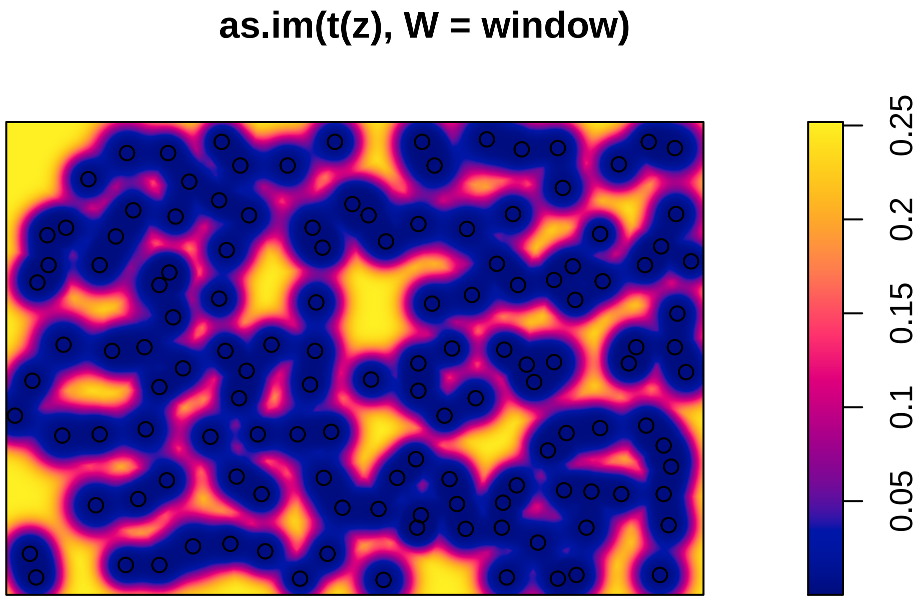
```
fit <- ppjsdm::gibbsm(configuration,
                      window = window,
                      model = model,
                      medium_range_model = medium_range_model,
                      short_range = short_range,
                      medium_range = medium_range,
                      long_range = long_range,
                      use_glmnet = TRUE,
                      use_aic = TRUE,
                      saturation = 2)
#> (Intercept) log_lambda1    alpha_1_1    gamma_1_1
#>    0.000000   -1.378804    -4.320294     0.000000
plot(fit$complete)
```



```
print(fit$coefficients)
#> (Intercept) log_lambda1   alpha_1_1   gamma_1_1
#>    0.000000   -1.378804   -4.320294    0.000000
print(fit$best_short)
#>          [,1]
#> [1,] 5.531309
print(fit$best_medium)
#>          [,1]
#> [1,] 13.14443
print(fit$best_long)
#>          [,1]
#> [1,] 21.62295
print(fit$aic)
#> [1] -388.9813
print(fit$bic)
#> [1] -384.48
```

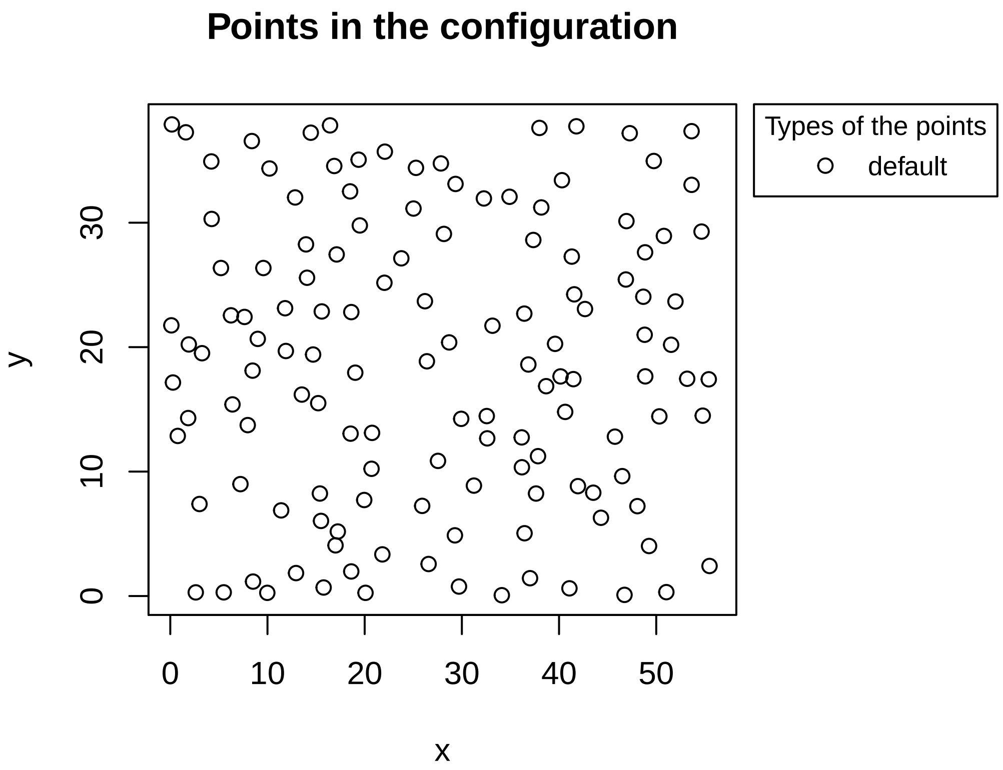
We may then plot the corresponding Papangelou conditional intensity.

```
parameters <- get_parameters_from_fit(fit)
lambda <- parameters$lambda
alpha <- parameters$alpha
gamma <- parameters$gamma
plot_papangelou(window = window,
                configuration = configuration,
                type = 1,
                mark = mean(spruces$marks),
                model = model,
                medium_range_model = medium_range_model,
                alpha = alpha,
                lambda = lambda,
                beta = matrix(0, 1, 0),
                gamma = gamma,
                covariates = list(),
                short_range = fit$best_short,
                medium_range = fit$best_medium,
                long_range = fit$best_long,
                saturation = 2)
```



It is also possible to draw from the model.

```
parameters <- get_parameters_from_fit(fit)
lambda <- parameters$lambda
alpha <- parameters$alpha
gamma <- parameters$gamma
draw <- ppjsdm::rgibbs(window = window,
                       alpha = alpha,
                       lambda = lambda,
                       gamma = gamma,
                       model = model,
                       medium_range_model = medium_range_model,
                       short_range = fit$best_short,
                       medium_range = fit$best_medium,
                       long_range = fit$best_long,
                       types = levels(types(configuration)),
                       mark_range = c(min(get_marks(configuration)), max(get_marks(configuration))),
                       steps = 10000000)
print(draw)
#> An S3 object representing a configuration.
#>
#> Number of points: 132.

par(mar = c(5, 4, 4, 13) + 0.1)
plot(draw, window = window)
```


Points in the configuration
Types of the points
○ default
y
x