LKrigNWSCExample.R

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```
load("NWSC2.rda")
library( LatticeKrig)
```

```
## Loading required package: spam
```

```
## Loading required package: dotCall64
```

```
## Loading required package: grid
```

```
## Spam version 2.2-2 (2019-03-07) is loaded.
## Type 'help( Spam)' or 'demo( spam)' for a short introduction
## and overview of this package.
## Help for individual functions is also obtained by adding the
## suffix '.spam' to the function name, e.g. 'help( chol.spam)'.
```

```
##
## Attaching package: 'spam'
```

```
## The following objects are masked from 'package:base':
##
##     backsolve, forwardsolve
```

```
## Loading required package: fields
```

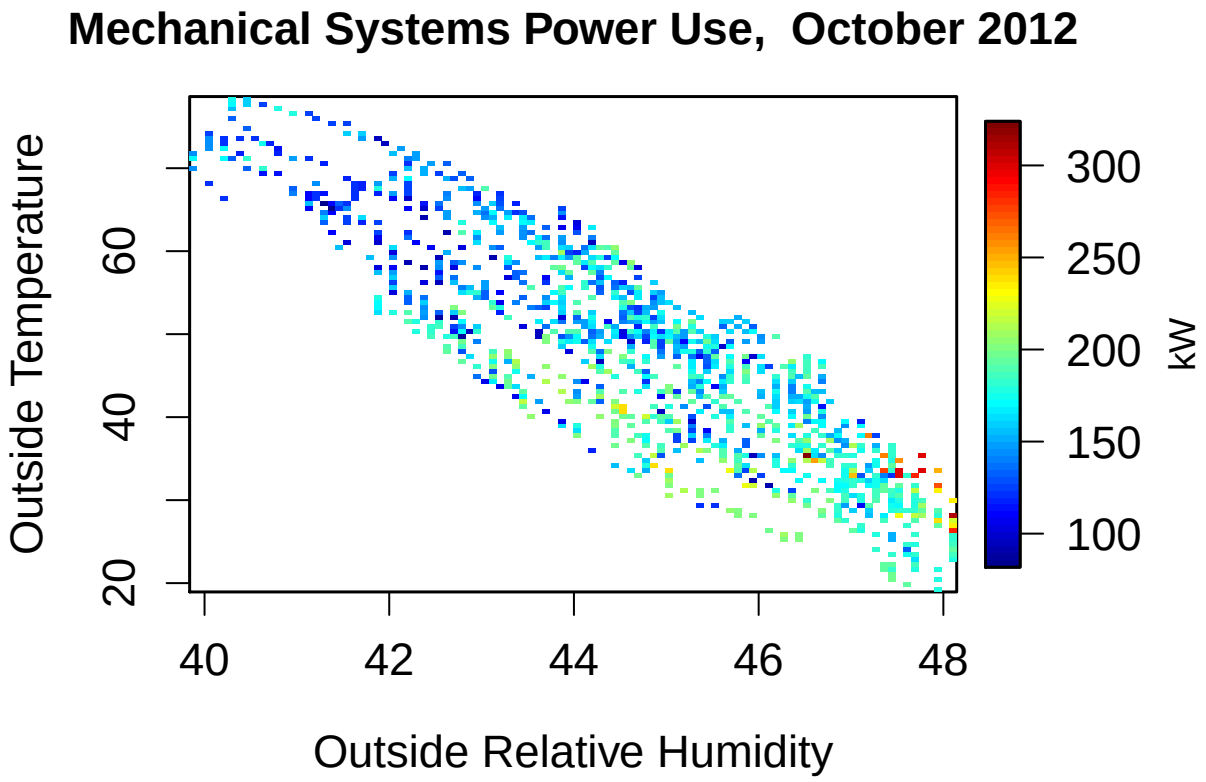
```
## Loading required package: maps
```

```
## See https://github.com/NCAR/Fields for
##  an extensive vignette, other supplements and source code
```

```
# LatticeKrig and also spatialProcess do not handle
# spatial replicates. Replace with average.

out<- Krig.replicates(x=cbind(NWSC$Otemp, NWSC$RH ) ,
                      y=NWSC$Mpower)
x<- out$xM
y<- out$yM

# EDA plot
#pdf("pix/figMpower.pdf", width=7, height=6)
fields.style()
par(mar=c(5,4,3,1))
quilt.plot( cbind(NWSC$RH, NWSC$Otemp ) , NWSC$Mpower, nrow=100, ncol=100,
                  xlab="Outside Relative Humidity", ylab="Outside Temperature",
                  main= "Mechanical Systems Power Use,  October 2012",
                  legend.mar=8.1,
                  legend.args=list( text="kW", cex=1.2, side=4,
                                    line=3))
```




```
#dev.off()

# standard computation using thin plate spline  takes about
# 6 seconds
system.time(
  fit0 <- Tps(x,y)
)
```

```
##    user  system elapsed
##   6.737   0.119   6.864
```

```
# spatial process estimate also finding correlation range
system.time(
  fit0 <- spatialProcess(x,y)
)
```

```
##    user  system elapsed
## 318.852   6.398 341.383
```

```
# takes about 100 seconds, 10 seconds if a.wght fixed
system.time(
  fit<- LatticeKrig( x,y, NC=10, nlevel=4, a.wght=8.4 )
)
```

```
##    user  system elapsed
##   7.297   0.140   7.442
```

```
system.time(
fit<- LatticeKrig( x,y, NC=10, nlevel=4, findAwght=TRUE )
)
```

```
##    user  system elapsed
```

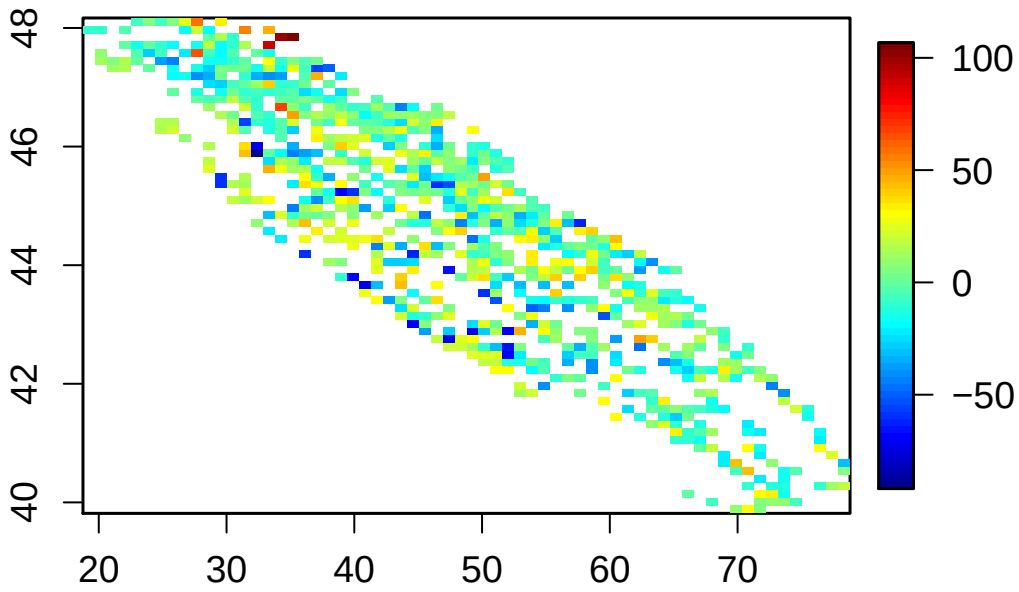
```
##  72.833   1.342  74.223
```

```
print( fit)
```

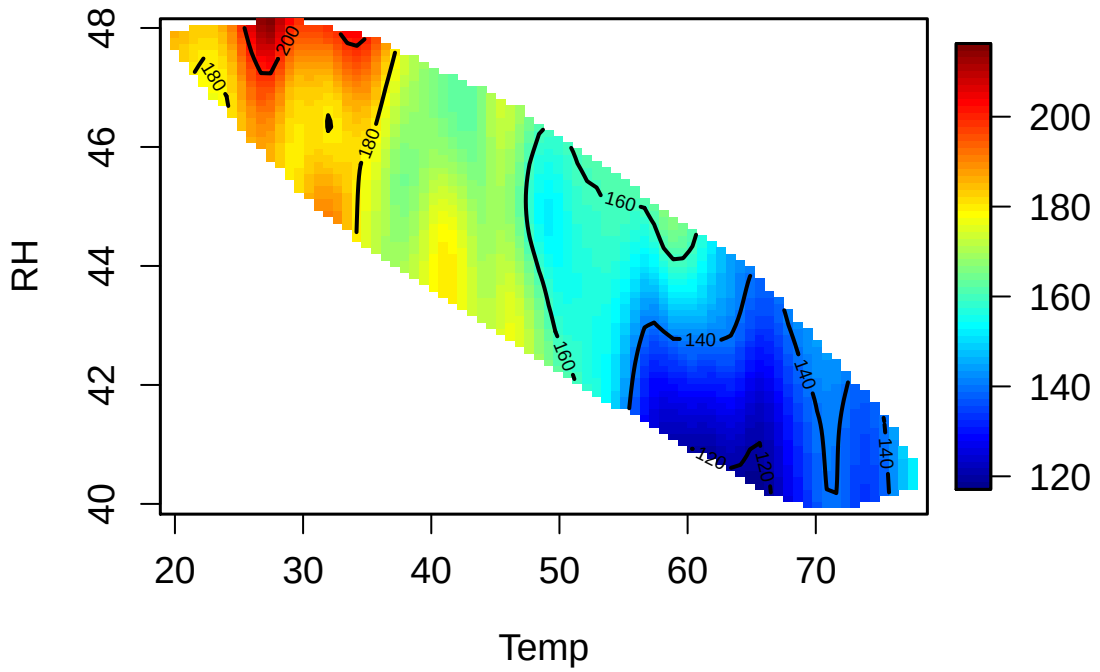
```
## Call:
## LatticeKrig(x = x, y = y, nlevel = 4, findAwght = TRUE, NC = 10)
##
##
##  Number of Observations:                      1677
##  Number of parameters in the fixed component 3
##   Effective degrees of freedom (EDF)         40.74
##     Standard Error of EDF estimate:          1.274
##  MLE sigma                                   30.53
##  MLE rho                                     954.1
##  MLE a.wght                                  8.482
##  MLE lambda = sigma^2/rho                    0.9769
##
## Fixed part of model is a polynomial of degree 1 (m-1)
## Basis function :  Radial
## Basis function used:  WendlandFunction
## Distance metric:  Euclidean
##
## Lattice summary:
## 4  Level(s) 3112 basis functions with overlap of  2.5 (lattice units)
##
##  Level Lattice points   Spacing
##      1            240 6.5664444
##      2            377 3.2832222
##      3            752 1.6416111
##      4           1743 0.8208056
##
## Nonzero entries in Ridge regression matrix 357579
```

```
## NULL
```

```
quilt.plot( x, fit$residuals)
```



```
surface( fit, xlab="Temp", ylab="RH")
```




```
# dev.copy2pdf( file="pix/NWSCfit.pdf", width=6, height=4)

simFit<- LKrig.sim.conditional( fit,  M=50)
```

```
## 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28
```

```
image.plot( as.surface( simFit$x.grid, simFit$SE))
```