Types of graphs

Table I shows which plot types are available (some depend on whether for instance covariates or data below the limit of quantification are present in the dataset) for a NpdeObject object. Given an object x resulting from a call to npde or autonpde, default plots can be produced using the following command:

```
plot(x)
```

Different plots are also available using the option plot.type, as in:

```
plot(x,plot.type="data")
```

TABLE I. Types of plots available.

Plot types	Description types	
`data`	Plots the observed data in the dataset	
`x.scatter`	Scatterplot of the npde versus the predictor X (optionally can plot pd or npd instead)	
`pred.scatter`	Scatterplot of the npde versus the population predicted values	
`vpc`	Plots a Visual Predictive Check	
`loq`	Plots the probability for an observation to be BQL, versus the predictor X	
`ecdf`	Empirical distribution function of the npde (optionally pd or npd)	
`hist`	Histogram of the npde (optionally pd or npd)	
`qqplot`	QQ-plot of the npde versus its theoretical distribution (optionally pd or npd)	
~~`cov.x.scatter`~~	Scatterplot of the npde versus the predictor X, split by covariate	Quid ?
~~`cov.pred.scatter`~~	Scatterplot of the npde versus the population predicted values, split by ovariate	
~~`cov.ecdf`~~	Empirical distribution function of the npde (optionally pd or npd), split by covariate	
~~`cov.hist`~~	Histogram of the npde (optionally pd or npd), split by covariate	
~~`cov.qqplot`~~	QQ-plot of the npde versus its theoretical distribution (optionally pd or npd), split by covariate	

The final five plots can also be accessed with the base plot and the option:

```
covsplit=TRUE
```

For instance, the following instruction:

```
plot(x,plot.type="cov.x.scatter")
```

is equivalent to:

```
plot(x,plot.type="x.scatter",covsplit=TRUE)
```

Options for graphs

Default layout for graphs in the **npde library** can be modified through the use of many options. An additional document, **demo_npde2.0.pdf**, is included in the **inst directory** of the package, presenting additional examples of graphs and how to change the options. Table **??** following table shows the options that can be set, either by specifying them on the fly in a call to plot applied to a NpdeObject object, or by storing them in the **prefs** component of the object. Note that not all of the graphical parameters in `par()` can be used, but it is possible for instance to use the xaxt="n" option below to suppress plotting of the X-axis, and to then add back the axis with the R function axis() to tailor the tickmarks or change colours as wanted. It is also possible of course to extract npde, fitted values or original data to produce any of these plots by hand if the flexibility provided in the library isn't sufficient. Please refer to the document `demo_npde2.0.pdf` for examples of graphs using these options.

General graphical options			
Plot types	**Description**	**Default value**	
~~new~~	Whether a new plot should be produced	TRUE	
~~ask~~	Whether users should be prompted before each new plot (if TRUE)	FALSE	
verbose	Output is produced for some plots (most notably when binning is used, this prints out the boundaries of the binning intervals) if TRUE	FALSE	
xaxt	A character which specifies the x axis type. Specifying "n" suppresses plotting of the axis	empty	à garder
yaxt	A character which specifies the y axis type. Specifying "n" suppresses plotting of the axis	empty	à garder
~~frame.plot~~	If TRUE, a box is drawn around the current plot	TRUE	
main	Title	empty	garder
main.title	Main title		main
sub.title	Title for covariate		sub
size.main.title	Size of the main title		size.main
size.sub.title	Size of the title for covariate		size.sub
xlab	Label for the X-axis	depends on plot	
ylab	Label for the Y-axis	depends on plot	
size.xlab	Size of the label for the X-axis		
size.ylab	Size of the label for the Y-axis		
xlog	Scale for the X-axis (TRUE: logarithmic scale)	FALSE	
ylog	Scale for the Y-axis (TRUE: logarithmic scale)	FALSE	
~~cex~~	A numerical value giving the amount by which plotting text and symbols should be magnified relative to the default	1	
~~cex.axis~~	Magnification to be used for axis annotation relative to the current setting of 'cex'	1	
~~cex.lab~~	Magnification to be used for x and y labels relative to the current setting of 'cex'	1	
~~cex.main~~	Magnification to be used for main titles relative to the current setting of 'cex'	1	

General graphical options (continued)			
Plot types	**Description**	**Default value**	
~~mfrow~~	Page layout (NA: layout set by the plot function or before)	NA	
grid.arrange	Size of the title for covariate		
xlim	Range for the X-axis (NA: ranges set by the plot function)	NA	
ylim	Range for the Y-axis (NA: ranges set by the plot function)	NA	
~~type~~	Type of plot ("b": both, "p": points, "l": lines). Defaults to b for data and p for other plots	b/p	à garder
size.text.x	Size for the numbers on the X-axis		
size.text.y	Size for the numbers on the Y-axis		
x.breaks	Number of ticks for the X-axis		breaks.x
y.breaks	Number of ticks for the Y-axis		breaks.y
plot.loq	Plot for the abline at the value of the loq		doublon (dans le code aussi)

Options controlling the type of plots		
Parameter	Number of label for the X-axis **Description**	**Default value**
`plot.type`	Type of plot (see documentation for list)	default
`ilist`	List of subjects to include in the individual plots	1:N
~~`smooth`~~	Whether a smooth should be added to certain plots	FALSE
~~`line.smooth`~~	Type of smoothing (l=line, s=spline)	s
`which.cov`	Which covariates to use for the plot	all
`ncat`	Number of categories in which to split continuous covariates for graphs Defaults to 3, splitting in $<Q_1$, Q_1-Q_3, $>Q_3$	3
~~`which.resplot`~~	Type of residual plot ("res.vs.x": scatterplot & c("res.vs.x","res.vs.pred", & versus X, "res.vs.pred": scatterplot versus predictions, "dist.hist": histogram, "dist.qqplot": QQ-plot) & "dist.qqplot","dist.hist")	
~~`box`~~	If TRUE, boxplots are produced instead of scatterplots	FALSE

Options for colours and line types			
Parameter	**Description**	**Default value**	
col	Symbol and line colour for observed data	black	
	applies to col.pobs and col.lobs if not given		
lty	Line type for observed data	1 (straight line)	
lwd	Line width for observed data	0.8	
size	Size for observations	1.2	
alpha	Default transparency	1	
~~col.lobs~~	Symbol colour for observations (lines)	steelblue4	remettre
col.pobs	Symbol colour for observations (points)	steelblue4	
pch.pobs	Default symbol type	20 (dot)	
~~lty.lobs~~	Line type for observations	1	deprecated (lty)
~~lwd.lobs~~	Line width for observations	1	deprecated (lwd)
~~alpha.pobs~~	Transparency for observations		deprecated (alpha)
col.pcens	Symbol colour for censored observations	red	
pch.pcens	Default symbol type for censored observations	8 ()	
size.pcens	size for censored observations	1.2	
alpha.pcens	Transparency for censored observations	1	
~~col.abline~~	Colour of the horizontal/vertical lines added to the plots	"DarkBlue"	deprecated
~~lty.abline~~	Type of the lines added to the plots	2 (dashed)	deprecated
~~lwd.abline~~	Width of the lines added to the plots	2	deprecated
col.x50	Colour for the median line for loq plot		col.bands
	Colour of the prediction bands in the loq plot		fill.bands
lty.x50	Type of the median prediction line in loq plot		lty.bands
lwd.x50	Width of the median prediction line in loq plot		lwd.bands
alpha.x50	Transparency of the median prediction line in loq plot		alpha.bands

Options for colours and line types			
Parameter	**Description**	**Default value**	
bar.bands.color	Colour of the line around the prediction bars of an histogram		col.bands
bar.bands.fill	Colour of the prediction bars of an histogram		fill.bands
bar.bands.alpha	Transparency of the prediction bars of an histogram		alpha.bands
bar.bands.lty	Type of the line around the prediction bars of an histogram		lty.bands
bar.bands.lwd	Size of the line around the prediction bars of an histogram		lwd.bands
bar.color	Colour of the line around the bars of an histogram		col
bar.fill	Colour of the bars of an histogram		fill
bar.alpha	Transparency of the bars of an histogram		alpha
bar.lty	Type of the line around the bars of an histogram		lty
bar.lwd	Size of the line around the bars of an histogram		lwd
col.fillpi	Colour used to fill histograms and prediction bands	slategray1	fill.bands
col.fillmed	Colour used to fill prediction band on the median (VPC, npde)	pink	fill.med
col.lmed	Colour used to plot the predicted median (VPC, npde)	indianred4	col.med
col.lpi	Colour used to plot lower and upper quantiles	slategray4	col.bands
lty.lmed	Line type used to plot the predicted median (VPC, npde)	2	lty.med
lty.lpi	Line type used to plot lower and upper quantiles	2	lty.bands
lwd.lmed	Line width used to plot the predicted median (VPC, npde)	1	lwd.med
lwd.lpi	Line width used to plot lower and upper quantiles	1	lwd.bands

Options for colours and line types			
Parameter	**Description**	**Default value**	
alpha.bnds	Transparency of the confidence interval for the plot		alpha.bands
fillcolor.bnds	Colour of the confidence interval for the plot		fill.bands
col.bnds	Colour for the lines of the mean and bounds of the confidence interval for the plot		col.bands
lty.bnds	Type for the lines of the mean and bounds of the confidence interval for the plot		lty.bands
lwd.bnds	Width of the lines of the mean and bounds of the confidence interval for the plot		lwd.bands
alpha.bnds.median	Transparency for the color of the confidence interval for the plot		alpha.med
fillcolor.bnds.median	Colour for the median prediction band		fill.med
col.bnds.median	Colour for lines of the boundaries of the median prediction band		col.med
lty.bnds.median	Type for the lines the boundaries of the median prediction band		lty.med
lwd.bnds.median	Width of the the lines the boundaries of the median prediction band		lwd.med
alpha.bnds.upp.low	Transparency for the lines the bounds of the median prediction band		alpha.bands
fillcolor.bnds.upp.low	Colour for the upper and lower prediction band		fill.bands
col.bnds.upp.low	Colour for lines of the bounds of the upper and lower prediction band		col.bands
lty.bnds.upp.low	Type for lines of the bounds of the upper and lower prediction band		lty.bands
lwd.bnds.upp.low	Width of the lines of the bounds of the upper and lower prediction band		lwd.bands
col.line.pred.median	Colour for lines of the mean prediction		col.med
lty.line.pred.median	Type for lines of the mean prediction		lty.med
lwd.line.pred.median	Size for lines of the mean prediction		lwd.med
col.line.pred.upp.low	Colour for lines of the upper and lower prediction		col.bands
lty.line.pred.upp.low	Type for lines of the upper and lower prediction		lty.bands
lwd.line.pred.upp.low	Size for lines of the upper and lower prediction		lwd.bands

Graphical options for VPC and residual plots		
Parameter	**Description**	**Default value**
bands	Whether prediction intervals should be plotted	TRUE
approx.pi	If TRUE, samples from $\mathcal{N}(0,1)$ are used to plot prediction intervals, while if FALSE, prediction bands are obtained using pd/npde computed for the simulated data	TRUE
vpc.method	Method used to bin points (one of "equal", "width", "user" or "optimal"); at least the first two letters of the method need to be specified	"equal"
vpc.bin	Number of binning intervals	10
vpc.interval	Size of interval	0.95
vpc.breaks	Vector of breaks used with user-defined breaks (vpc.method="user")	NULL
vpc.extreme	Can be set to a vector of 2 values to fine-tune the behaviour of the binning algorithm at the boundaries; specifying c(0.01,0.99) with the "equal" binning method and vpc.bin=10 will create 2 extreme bands containing 1% of the data on the X-interval, then divide the region within the two bands into the remaining 8 intervals each containing the same number of data; in this case the intervals will all be equal except for the two extreme intervals, the size of which is fixed by the user; complete fine-tuning can be obtained by setting the breaks with the vpc.method="user"	NULL
pi.size	Width of the prediction interval on the quantiles	0.95
vpc.lambda	Value of lambda used to select the optimal number of bins through a penalised criterion	0.3
vpc.beta	Value of beta used to compute the variance-based criterion (Jopt,beta(I)) in the clustering algorithm	0.2
bands.rep	Number of simulated datasets used to compute prediction bands	200

```
plot(xtheo_cens,plot.type="x.scatter",which="npde",

      main.title = "npde vs time data xtheo_cens",
      size.main.title = 14,
      sub.title = "", # no sub.title
      size.sub.title = "",

      xlab= "Time",
      ylab= "npde",
      size.xlab = 12,
      size.ylab = 12,
      xlim=c(), # by default
      ylim=c(), # by default
      approx.pi=TRUE,
      bands=TRUE,
      plot.obs=TRUE,

      alpha.bnds.median = 0.25,
      fillcolor.bnds.median = "firebrick4",
      col.bnds.median="red",
      lty.bnds.median=3,
      lwd.bnds.median=1,
      alpha.bnds.upp.low = 0.25,
      fillcolor.bnds.upp.low = "dodgerblue",
      col.bnds.upp.low="green",
      lty.bnds.upp.low=6,
      lwd.bnds.upp.low=1,
      col.line.pred.median = "red",
      lty.line.pred.median = 1,
      lwd.line.pred.median = 1,
      col.line.pred.upp.low = "blue",
      lty.line.pred.upp.low = 1,
      lwd.line.pred.upp.low = 1,

      col.pobs = "orangered3",
      pch.pobs = 12,
      size.pobs = 1.5,
      col.pencs = "yellow",
      pch.pencs = 15,
      size.pcens = 1.75,

      size.text.x = 10,
      size.text.y = 10,
      x.breaks = 10,
      y.breaks = 10,
      xlog = FALSE,
      ylog = FALSE)
```

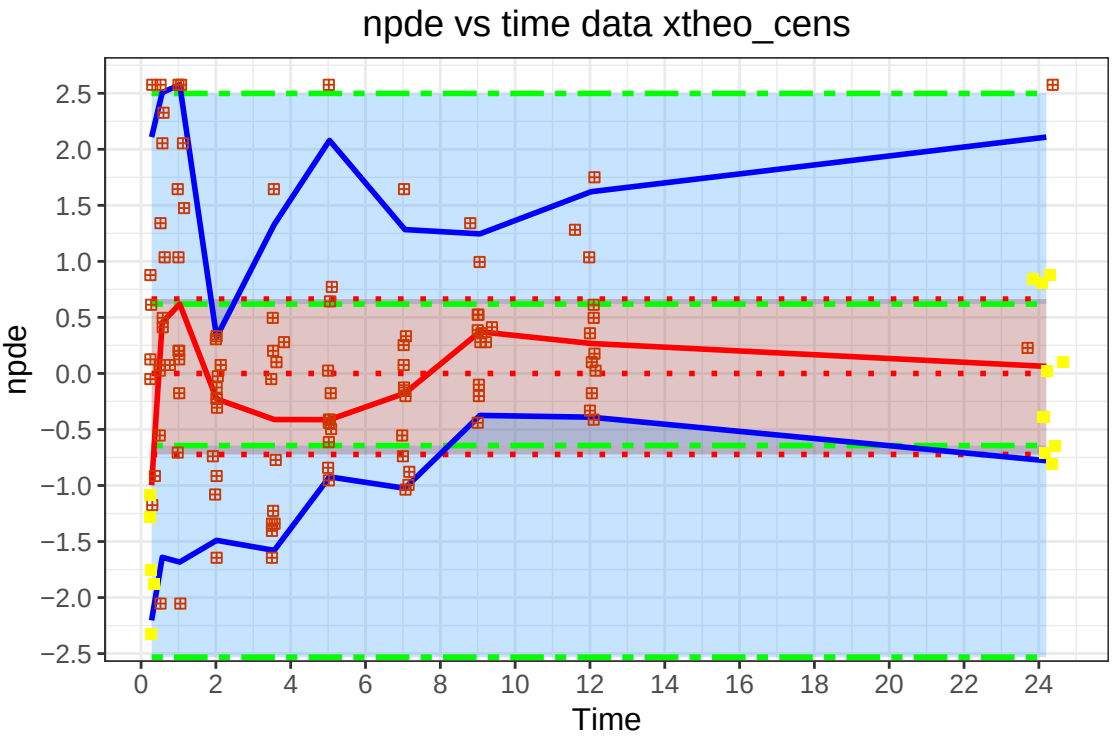

FIGURE 1. xtheo_cens_xscatter.