Appendix 1 - The wrapper

The wrapper involves a three-step process:

Step 1 - Selection of the data: the time on the X-axis is the series of days starting from the very first day after ovulation up to the last day of the cycle; i.e., days 1 to 14 in the case of a luteal phase lasting 14 days. Each day is then allocated a hormonal amplitude (i.e., standardized hormone level).

Step 2 - Creation of an artificial dataset in which each day is repeated at a frequency that is proportional to the hormonal level on that day. For example, if the amplitude has successive values 3, 5, and 7 on three successive days 1, 2, and 3; day 1 will be repeated three times, day 2 five times, and day 3 seven times. The artificial dataset created is therefore: 1,1,1,2,2,2,2,2,3,3,3,3,3,3,3.

Step 3 - Estimation of the parameter of a density distribution with the artificial dataset, using gamlss. In this case, the artificial dataset is used as the dependant variable, without using the weight statement.

The following function may be used in R:

c.s.d.t=function(x=day,y=hormone,precision=2) {
    # day is the time
    # hormone is the measurement
    # precision is the number of decimal of the measurement
    x=x[!is.na(y)&y>0];y=y[!is.na(y)&y>0];x=x[1:min(c(length(x),50))];
    y=y[1:min(c(length(y),50))];x=as.matrix(x,ncol=1)
    if(min(y)<1) y=y*1/min(y);
    y=round(y,precision);newy=round(y*10^precision);resultat=NULL;
    for(i in(1:length(x))){
        resultat=c(resultat,rep(x[i],newy[i]))
    }
    res=as.data.frame(resultat);res$jourpourmodel=(res[,1]-(min(res[,1])));res$maxjourmodel=(max(res$jourpourmodel));
    names(res)=c("trueday","rescaledday","lengthofwave")
    return(res)
}