**NRT detection using the same model used for monitoring**

We have n full solar years + the current one. The idea is that at the beginning of the current year we have of course no information but the expectation that it will follow the “average year”. So we have an expectation that sets the prior knowledge of model parameters (set by taking the average of the model parameters over n years so that I get also a measure of SD).

Once observations are coming we optimize the pdhtf over the available observations and taking into account our prior knowledge with the following cost function:

Where *cd* is the current decade, *np* is the number of parameters, *psup* and *pinf* are the upper and lower boundaries of the parameters. Denominators are placed to normalize the difference at the numerator.

The first term of the equation will increase its weight as we get more data for the current year. At the beginning of the year we have cd < np, the problem is ill posed and it is solved thanks to the prior knowledge.

Can we think about a linear (or exponential decay) weighting of the two terms based on the % of completed cycle to reinforce our understanding that when we have more data we should trust more the observations? I mean something like this:

Where α=(cd/length of the season). We could also divide the second term in two terms (first one with the 4 parameters describing the parameters growing hyper tangent and the second one describing the parameters of the decay phase). In this case we could use an α1 and a α2 based on the two phases (growth and decay).