Conventions in use with DET2STO

extracted from: J. Thénié, J.-Ph. Vial, Ch. van Delft, Automatic formulation of stochastic programs via an algebraic modeling language, *Computational Management Science*, 4(1), p.17-40, 2007.

The formulation must comply with conventions. The first convention is the set of standard modeling conventions in AMPL.

Convention 1

Indices are entered as arguments of functions, i.e., they are delimited by square brackets "[" and "]".
For instance, we write $f_t(x_0, x_1, \ldots, x_t, \xi_1, \xi_2, \ldots, \xi_t)$ as $f[t, x[0], x[1], \ldots, x[t], \xi[1], \xi[2], \ldots, \xi[t]]$

The next convention applies to variables and parameters whose values are contingent on the nodes of the event tree.

Convention 2

The time index at which the value of the variable or the parameter is fixed is first in the list of indices which influence the value of the variable or parameter.

For instance, we write $x[t, j]$, with j representing a location or a product type, and not $x[j, t]$.

In the declaration phase, one must define the set of all time periods, and possibly some of its subsets.

Convention 3

Any set of time periods starts with the same character string.

Our own convention is to denote `TIME` as the full set of time periods $\{0, \ldots, T\}$. The denomination of any subset of `TIME` will take the form `TIME<exp>`, e.g., `TIMEa` $= \{2, \ldots, T-1\}$.

In the problem definition (objective and constraints), the following convention is in force:

Convention 4

Time indices in variables and parameters are never replaced by constants.

For instance, we do not write $x[0] = 0$, but, in mathematical style, $\{x[t] = 0 \mid t = 0\}$.

Extension to variables with time lags

For the sake of simpler notation, we have not considered problems with time-lagged decisions. However it is often the case that a decision is to be taken at t but takes effect at $t + k$. This can be formalized by means of a double-indexing. We adopt the following convention:

Convention 5

If a variable or a parameter includes more than one time index, the first time index corresponds to the time at which the decision is taken; the subsequent time indices define the dates at which the parameter or variable has an impact.

For instance, $x[t, t+1]$ will be made contingent on nodes $[t, n], n \in S[t]$, but not to nodes $[t+1, m], m \in S[t+1]$.

go back to DET2STO website