

## Dynamic i\* Models (Models that Change over Time)

We extend i\* to enable analysis where the Leaf Nodes in the model change over time.

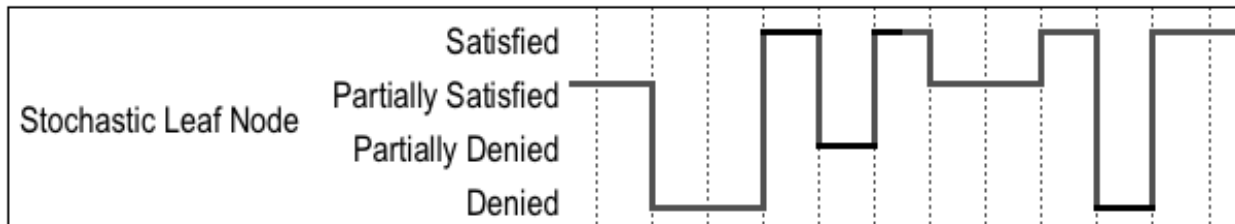
Recall to evaluate goal models we use the following evaluation labels.

Denied   Satisfied  
 Partially Denied   Partially Satisfied

Note: Unknown and Conflict labels are not used for Leaf Nodes in analysis.

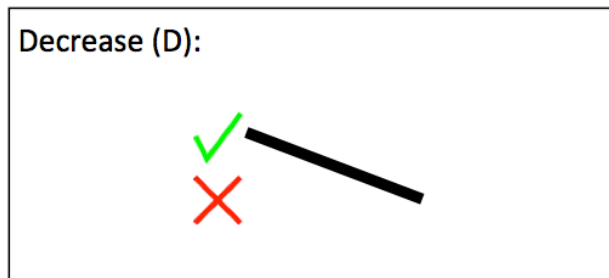
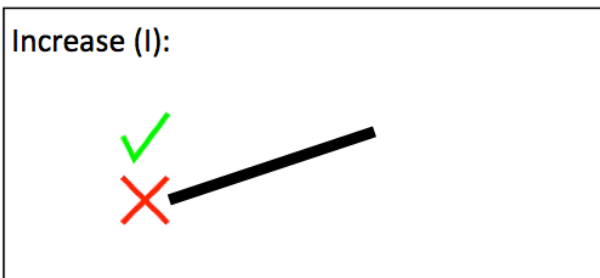
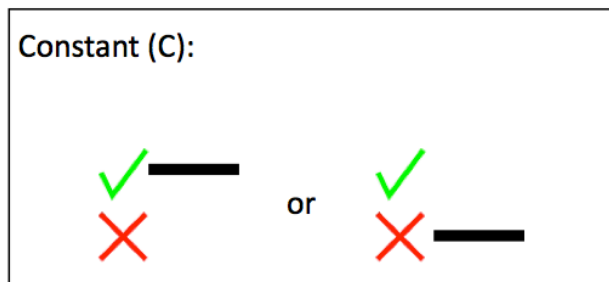
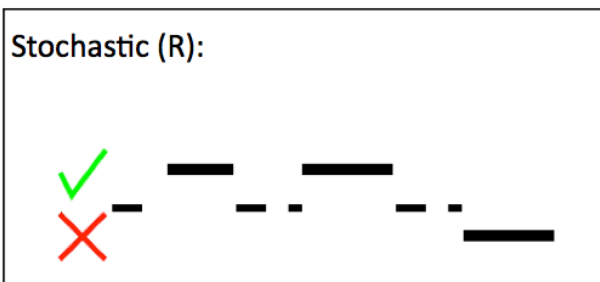
If the Leaf Nodes change *Stochastically* over time, this means that in the next state they can have any of the evaluation labels including the same one as the previous state.

Below is an example of the how a Stochastic Leaf Node might change over time.



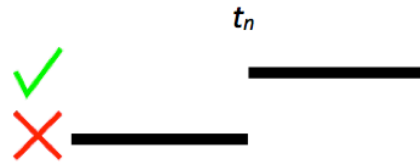
The next pages we defines the full lists of Dynamic Functions for Leaf Nodes.

## Elementary Functions



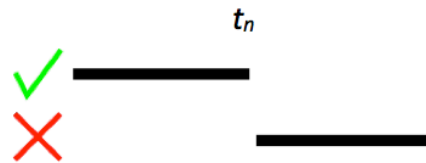
## Denied-Satisfied (DS)

Patterns:



## Satisfied-Denied (SD)

Patterns:



## Monotonic Negative (MN)

Patterns:



## Monotonic Positive (MP)

Patterns:



Note: FS is Satisfied (or Fully Satisfied) and FD is Denied (or Fully Denied)

Elementary Functions	
<i>Constant (C)</i>	the satisfaction evaluation remains constant at <i>constantValue</i>
<i>Increase (I)</i>	changes in satisfaction evaluation become “more true” to a <i>maxValue</i> as time progresses
<i>Decrease (D)</i>	changes in satisfaction evaluation become “less true” to a <i>minValue</i> as time progresses
<i>Stochastic (R)</i>	changes in satisfaction evaluation are stochastic or random
General Compound Function	
<i>User-Defined (UD)</i>	its value is a stepwise function defined by a sequence of other functions, repeating behaviour can be specified over a subset of the function
Common Compound Functions	
<i>Satisfied-Denied (SD)</i>	the satisfaction evaluation remains <i>FS</i> until $t_i$ and then remains <i>FD</i>
<i>Denied-Satisfied (DS)</i>	the satisfaction evaluation remains <i>FD</i> until $t_i$ and then remains <i>FS</i>
<i>Stochastic-Constant (RC)</i>	changes in satisfaction evaluation are stochastic or random until $t_i$ and then remains constant at <i>constantValue</i>
<i>Constant-Stochastic (CR)</i>	the satisfaction evaluation remains constant at <i>constantValue</i> until $t_i$ and then changes in evaluation are stochastic or random
<i>Monotonic Positive (MP)</i>	changes in satisfaction evaluation become “more true” to a <i>maxValue</i> at $t_i$ and then remains constant at <i>constantValue</i>
<i>Monotonic Negative (MN)</i>	changes in satisfaction evaluation become “less true” to a <i>minValue</i> at $t_i$ and then remains constant at <i>constantValue</i>