

Rollup Pattern simulation

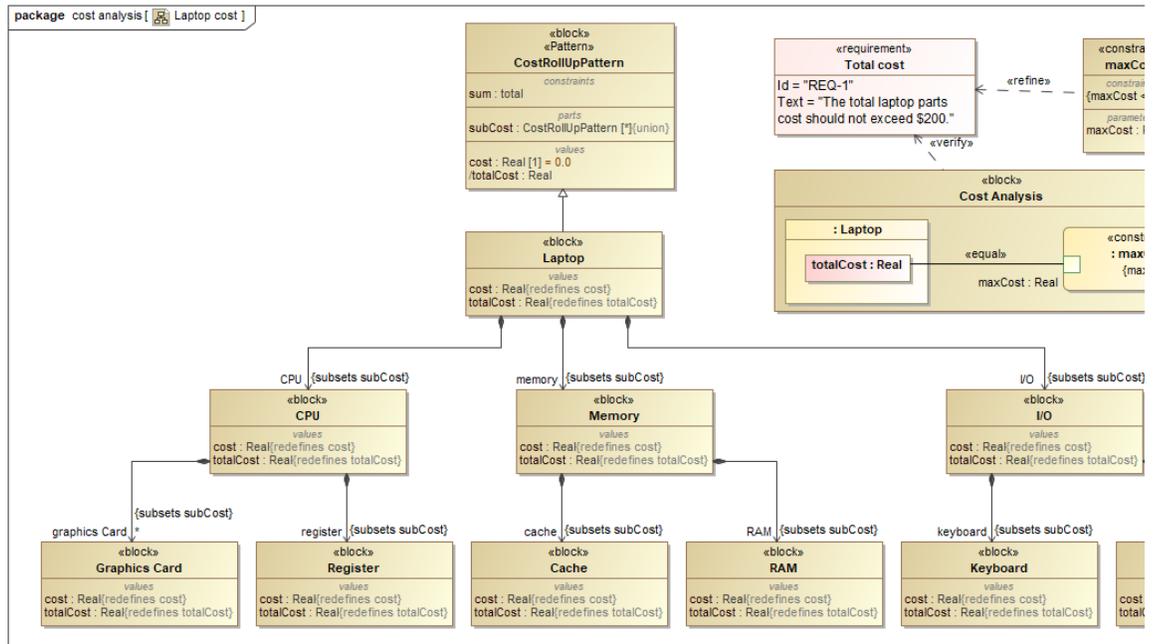
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Cameo Simulation Toolkit supports rollup calculations of total mass, cost, power, and another system dimension, based on individual values of all the parts in the model. Please refer to [Rollup Pattern Wizard](#), [applying Rollup Pattern Blocks](#), and [LaptopCostAnalysis](#) and [SpacecraftMassRollup](#) built-in samples for more details.

Simulation with a built-in rollup pattern

The **LaptopCostAnalysis** sample applies built-in **CostRollUpPattern**. The sample uses the **Cost Analysis** Block with the **Laptop** context Block as the Part. Optionally, you can add any constraint (*maxCost*) and Requirement (*Total cost*) and use a Parametric diagram to connect them as shown in the figure below.



The Cost Analysis Block containing the Laptop context Block applied with built-in CostRollUpPattern as the Part.

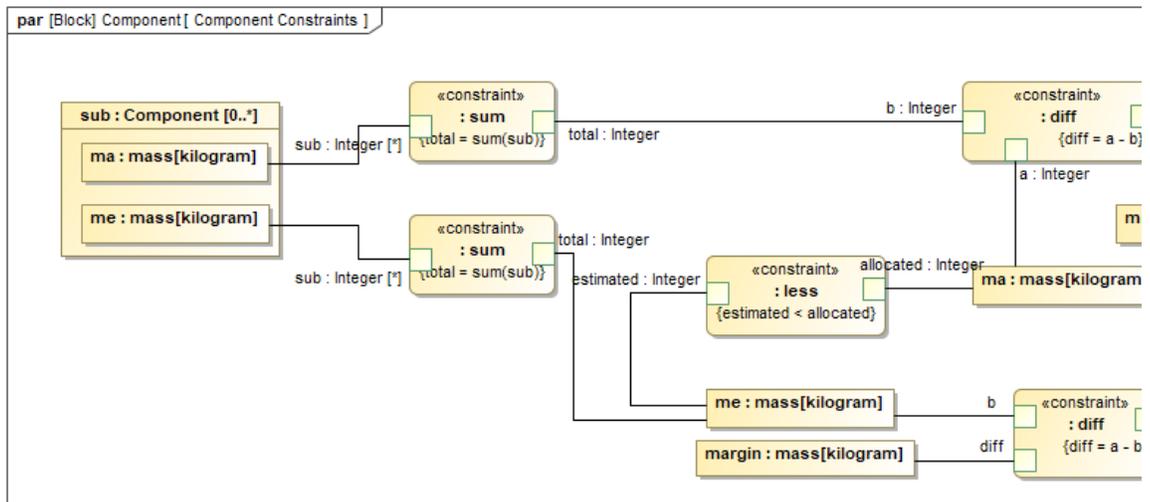
You can also either run the simulation through the **Cost Analysis** Block directly or use a [SimulationConfig](#) with *executionTarget = the Cost Analysis Block*. The result will be shown in the **totalCost** context Block, e.g., 220 (80+50+90) as shown in the figure below.

#	Name	Classifier
1	analysis	Cost Analysis
2	laptop	Laptop
3	io	I/O
4	keyboard	Keyboard
5	touchpad	Touchpad
6	memory	Memory
7	ram	RAM
8	cache	Cache
9	cpu	CPU
10	register	Register
11	gcard	Graphics Card

The totalCost context Block as the result of Laptop cost analysis applied with CostRollUpPattern.

Simulation with a custom rollup pattern

The **SpacecraftMassRollup** sample applies a custom rollup pattern through the same [applying Rollup Pattern Block](#) like the built-in one but requires selecting a Pattern Block for the custom rollup pattern, e.g., **Component**. The **Component** Pattern Block uses value type properties binding with 5 constraint properties in the Parametric diagram as shown below.



A Parametric diagram of the Component custom rollup pattern as a Pattern Block.

Optionally, you can add any constraint (*less*) and Requirement (*Estimated mass*), and then run the *spacecraft mass analysis* [SimulationConfig](#) with the *executionTarget* as an instance of the spacecraft to run. The result of evaluation, according to the $me < ma$ rule, will be highlighted at *me : mass[kilogram]* for each component shown on the right side in the Block Definition diagram as shown below.

Simulation

Variables

Name	Value
spacecraft	spacecraft : spacecraft...
ma : mass[kilogram]	130.0000
margin : mass[kilogram]	35.0000
me : mass[kilogram]	95.0000
mr : mass[kilogram]	15.0000
P : telecom {subsets sub}	telecom : telecom@c0...
ma : mass[kilogram]	35.0000
margin : mass[kilogram]	8.0000
me : mass[kilogram]	27.0000
mr : mass[kilogram]	5.0000
P : amplifier {subsets sub}	amplifier : amplifier@...
P : antenna {subsets sub}	antenna : antenna@11...
P : propulsion {subsets sub}	propulsion : propulsio...
ma : mass[kilogram]	80.0000
margin : mass[kilogram]	12.0000
me : mass[kilogram]	68.0000
mr : mass[kilogram]	7.0000
P : tank {subsets sub}	tank : tank@5dd4c95c
P : thruster {subsets sub}	thruster : thruster@14...
ma : mass[kilogram]	29.0000
margin : mass[kilogram]	-1.0000
me : mass[kilogram]	30.0000
mr : mass[kilogram]	2...

System decomposition

bdd [Package] structure [System decomposition]

All parts of the spacecraft subtype Component. All roles subset "sub" components.

Component

constraints

- sum
- diff
- less
- diff

values

- ma : mass[kilogram]
- me : mass[kilogram]
- mr : mass[kilogram]
- margin : mass[kilogram]

sub 0..* «satisfy» (union)

Est

id = "1"
Text = "E shall be le mass"

Requirement 1 - "Estimated mass shall be less than allocated mass" is not satisfied.

The evaluation result (me : mass[kilogram]) of the SpacecraftMassRollup sample applied with the Component custom rollup pattern.