

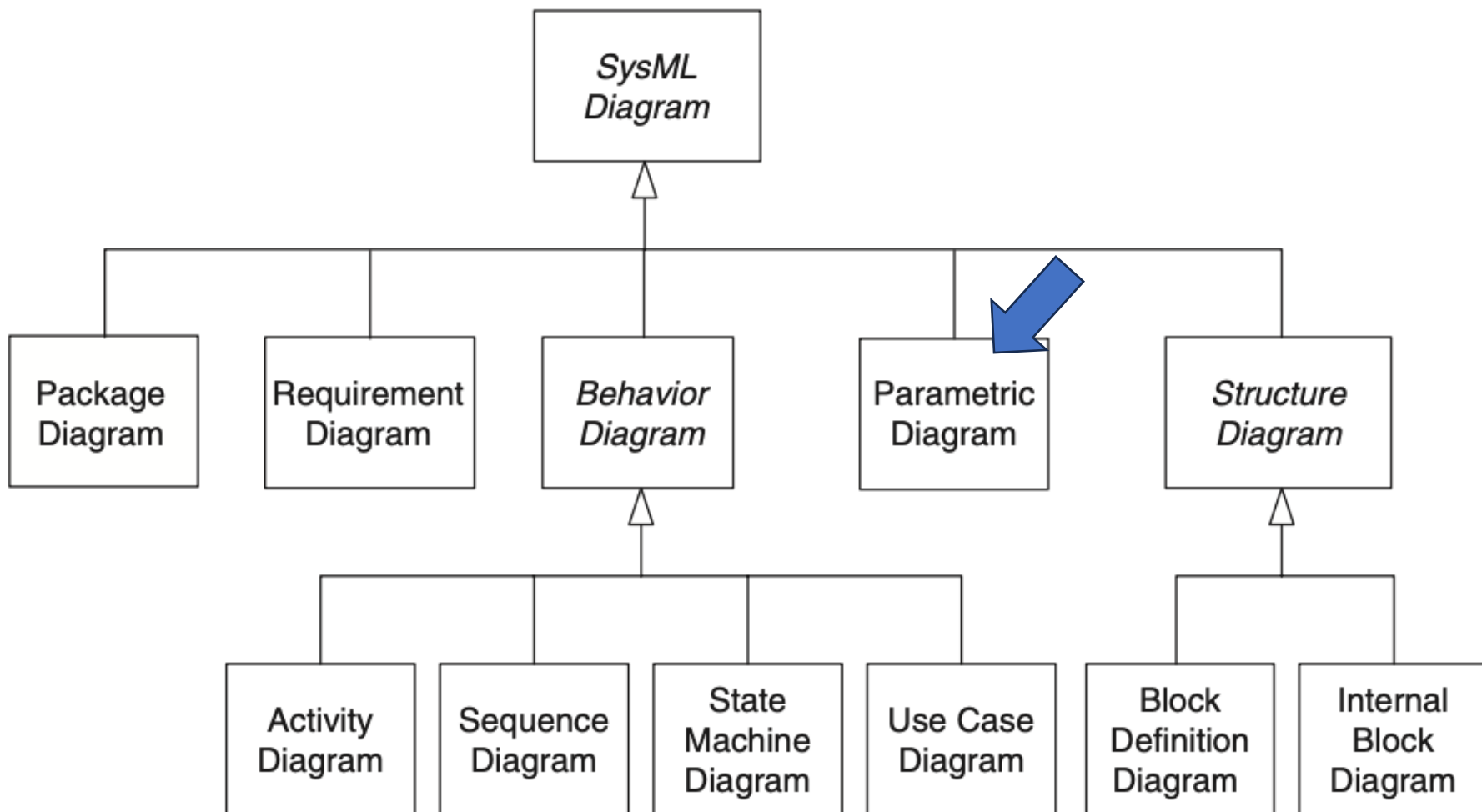


Graduate Program in Science and Space Technologies (PG-CTE)

*SPACE SYSTEMS, TESTING AND LAUNCHING (CTE-E)*

# PARAMETRIC / REQUIREMENTS AND PACKAGE

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**FIGURE 3.1**

SysML diagram taxonomy.



# Parametric Diagram

MODELING CONSTRAINTS WITH PARAMETRICS – CHAPTER 8



# Introduction

- A typical design effort includes the **need to perform different types of engineering analyses**, such as budget analysis, sensitivity analysis, and design optimization.
- May include analysis of system performance, reliability, cost, and properties into consideration.
- SysML supports this type of analysis through the use of parametric models.
- Parametric models **constrain the properties of a system**, which can be evaluated by an appropriate analysis tool.
- Constraints are expressed as **equations**, with the **parameters of the equations being linked to the Properties (values)** of the system being analyzed.



# Constraint Block

- SysML introduces the **constraint block** to support the construction of parametric models.
- A **constraint block** is a special type of block **used to define equations** so that they can be reused and interconnected.
- Constraint blocks have two main features: **a set of parameters and an expression. (Constraint).**

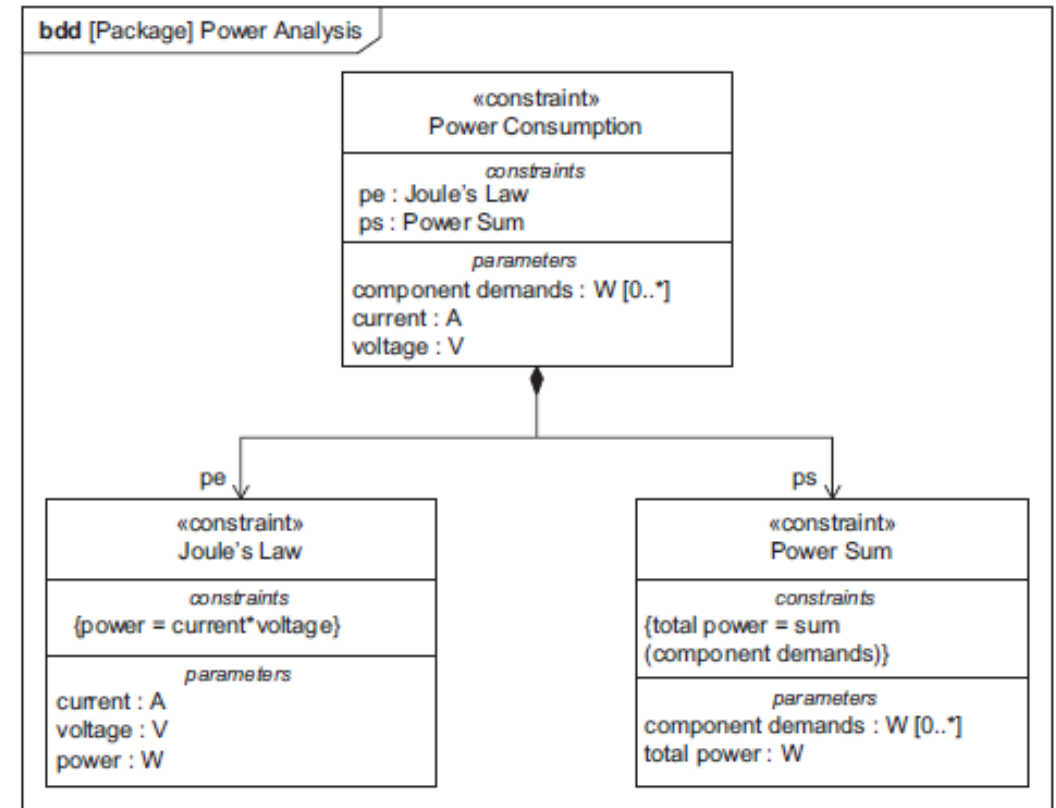


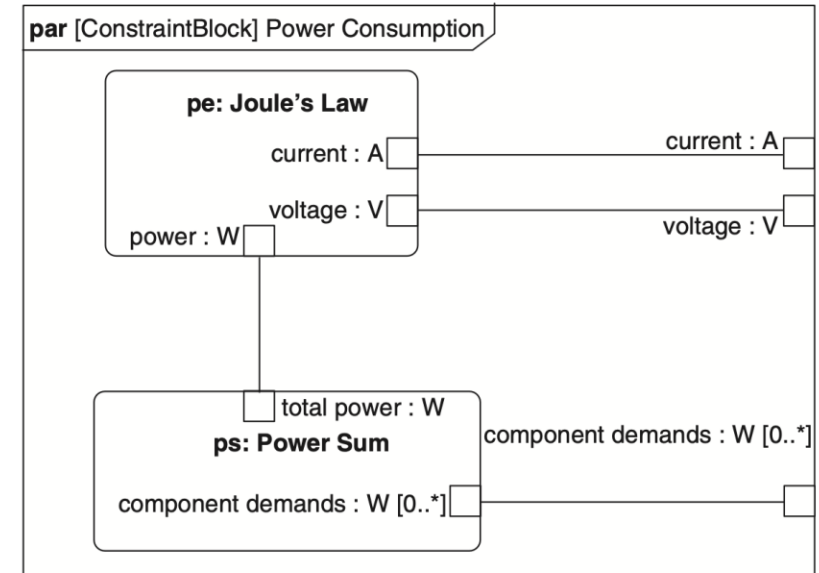
FIGURE 8.5

A hierarchy of constraints on a block definition diagram.



# Parametric Diagram

- Parametric diagrams are used to create systems of equations that can constrain the properties of blocks.
- The full header for a parametric diagram is as follows:  
  
*par [model element kind] model element name [diagram name]*

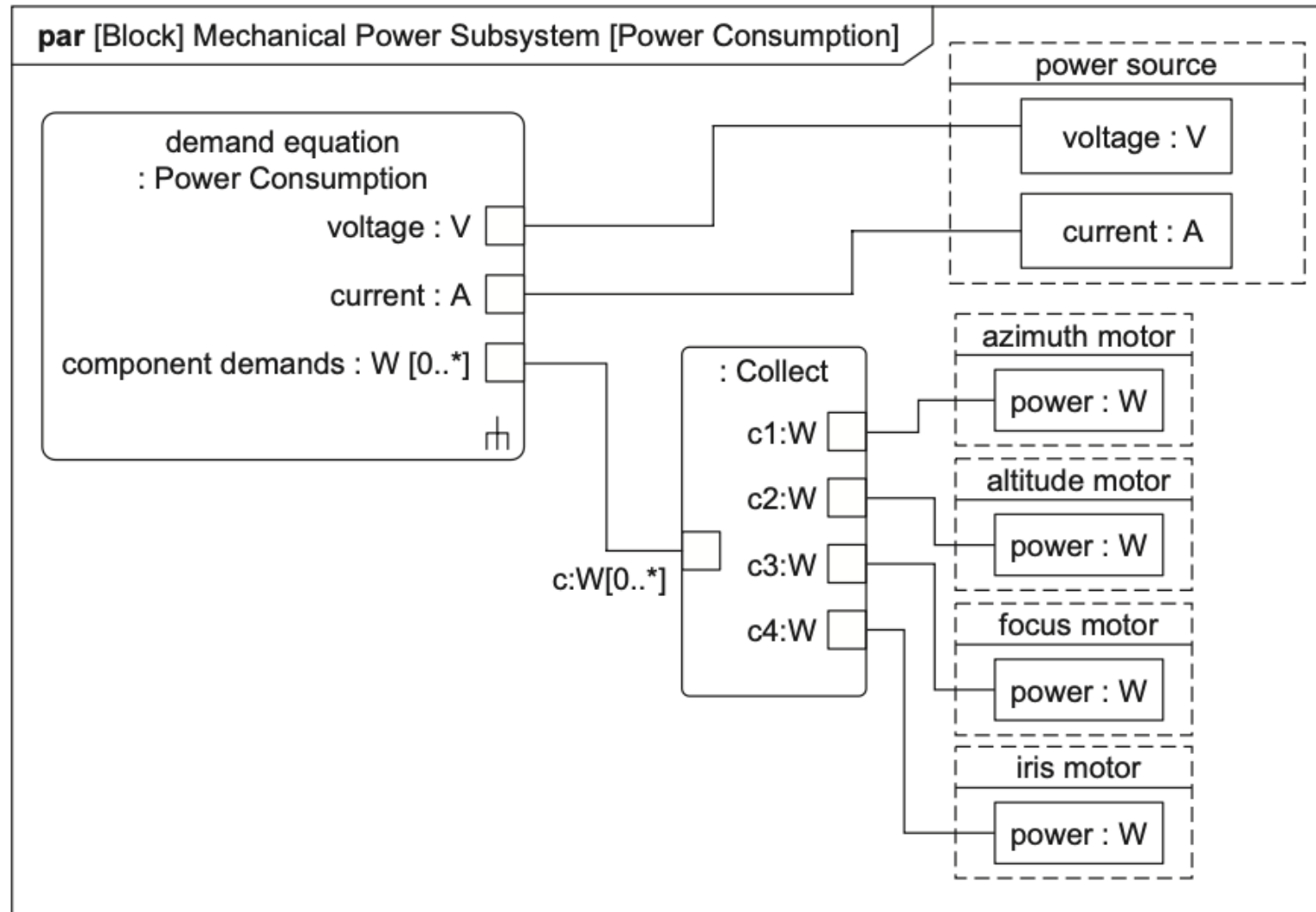


**FIGURE 8.2**

A parametric diagram used to construct systems of equations.



# Interlinking parameters



**FIGURE 8.7**

Binding constraints to properties on a parametric diagram.



# Pointing values

- To enable an analysis tool to evaluate tiles containing constraint properties, at least some of the **value properties** of the block under analysis need to have specific values defined.
- Often, these values are provided during analysis through the analysis tool interface, but they can also be specified using a block configuration.
  - *This is done by creating a block specialization with the required initial values, or by using an instance specification to describe a block instance.*

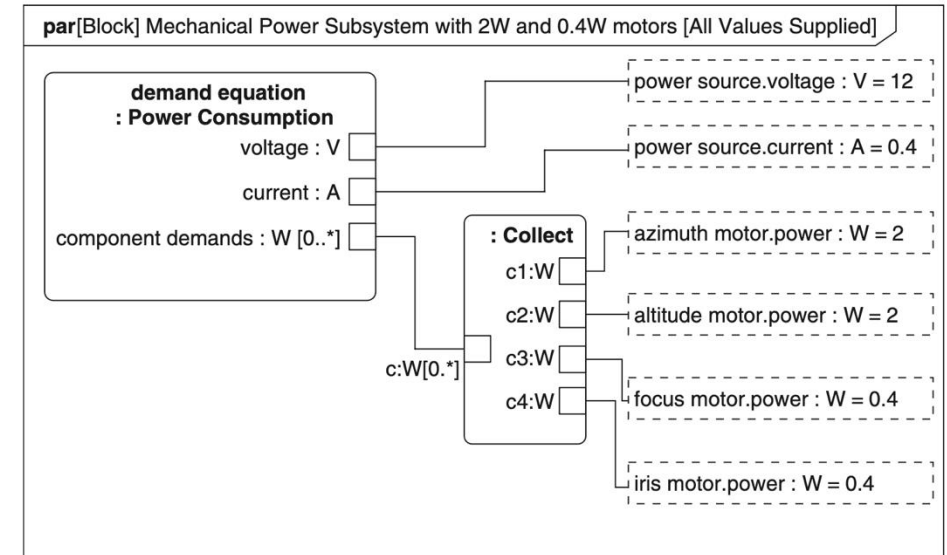


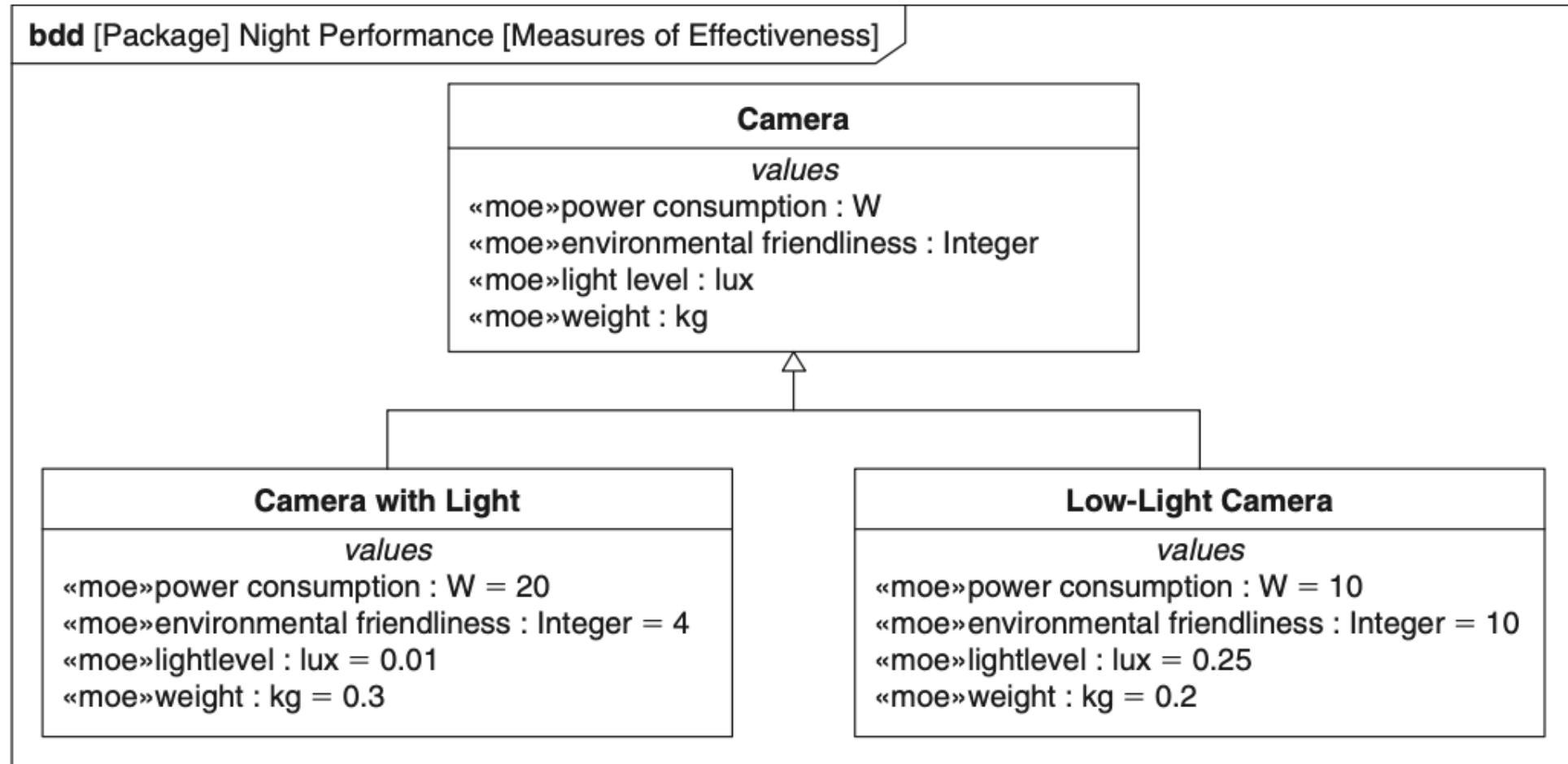
FIGURE 8.8

Describing a specific analysis configuration.





# Parameterizing allows comparison



**FIGURE 8.14**

Two variants of a camera for handling low-light conditions.