# PROJECT PROPOSAL

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## PROBLEM

Business Process Model and Notation (BPMN) is one of the most used representations for business process models, as it is graphically intuitive but also able to represent non-trivial process semantics; moreover, its notation is clear and understandable for all the stakeholders involved into a business. However, BPMN diagrams offer only the overview of certain process flows without being able to provide executable models that can derive information and/or quality indicators from the considered process.
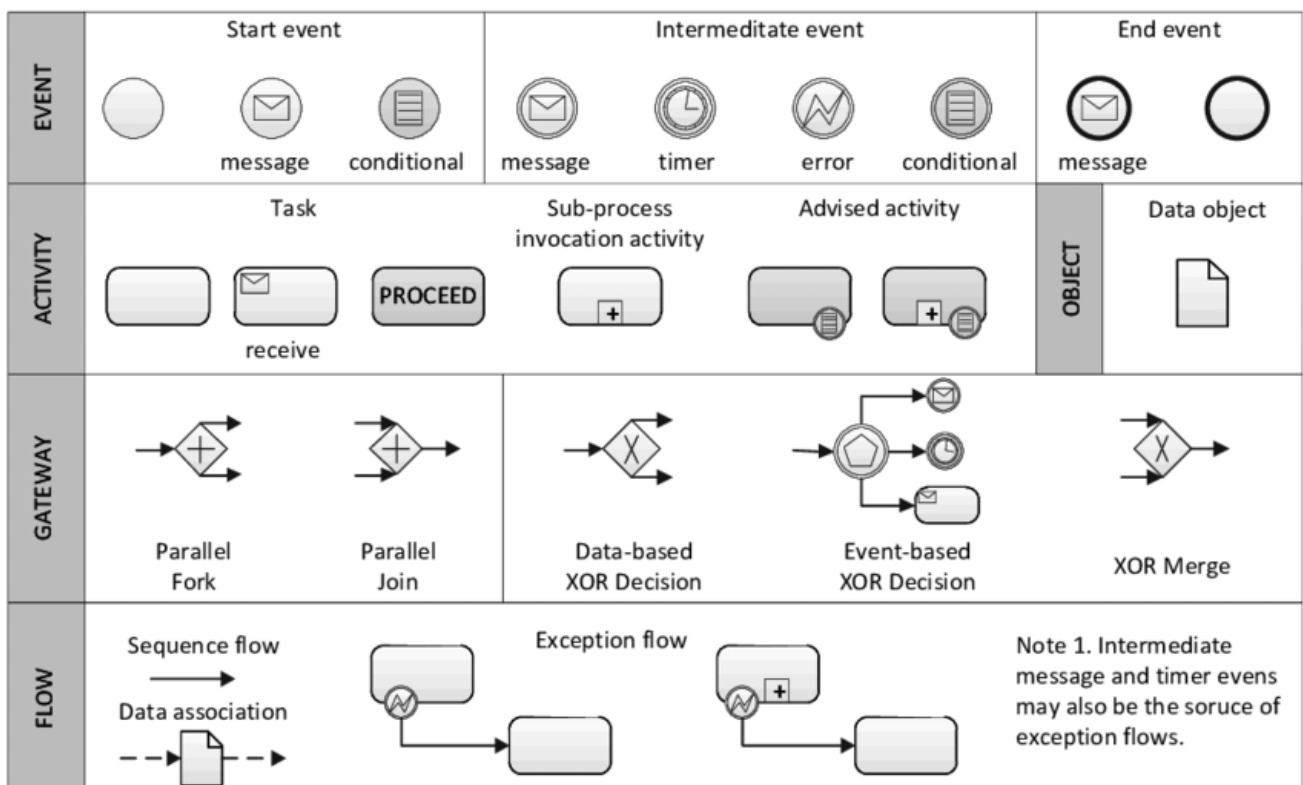


Fig. 1 A core subset of BPMN elements [1]

On the other hand, graphical programming environments for modeling and simulating dynamical systems exist and, among these, Simulink can also support and be supported by a multi-paradigm programming language, namely MATLAB. The objective of the project is, then, to manipulate BPMN diagrams to obtain material that can be simulated, in the form of MATLAB .m script files that contain all the commands needed to reproduce the model in the Simulink environment.
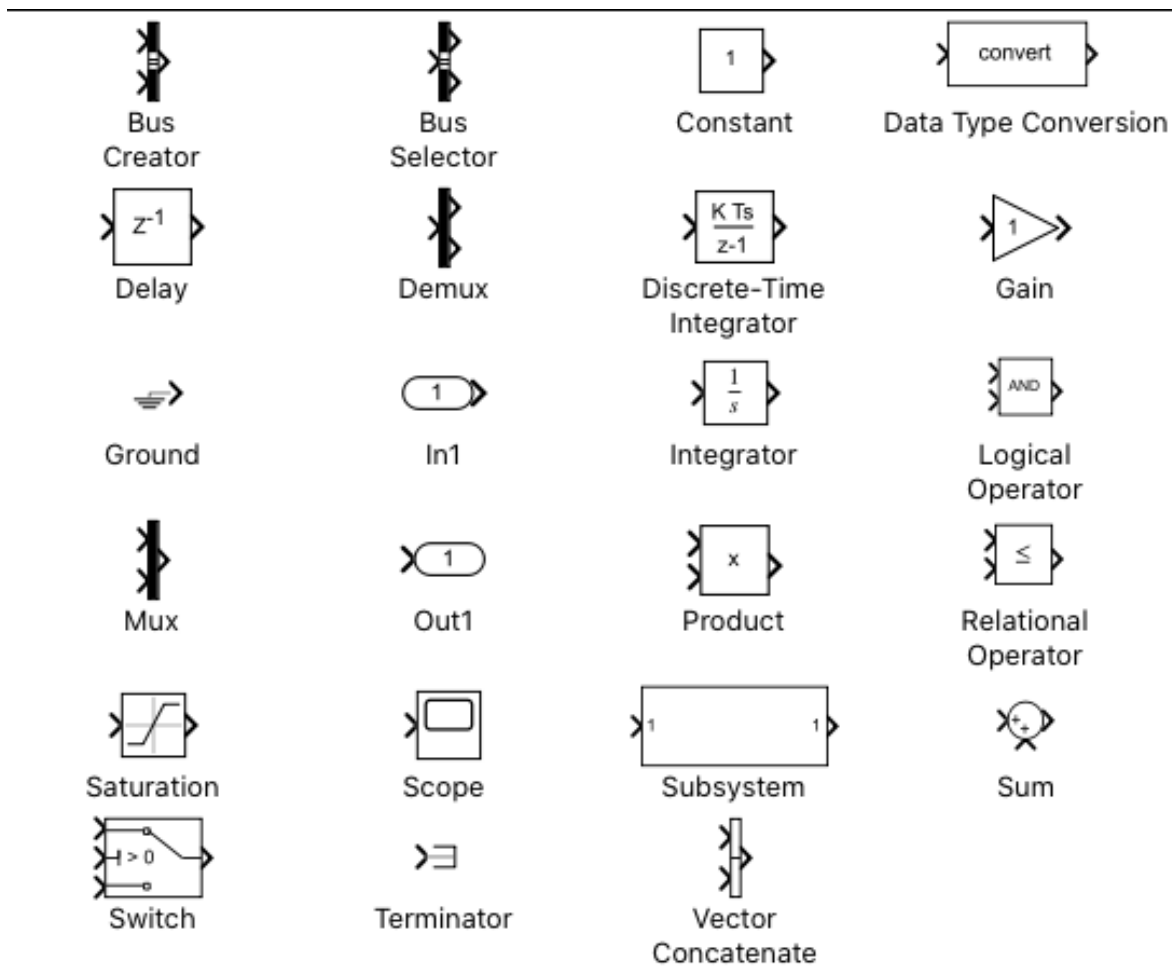
Fig. 2 Commonly Used Blocks in the Simulink Library

# MODEL AND METAMODELS

The metamodels needed in the project are two: the standard BPMN metamodel, retrievable, for instance, in the BPMN2 package of Eclipse Modeling Tools, and a custom metamodel that should be created to be as close as possible to the Simulink notation. The starting point of the project will be a business process described in BPMN notation and the custom metamodel should be able to represent the same process in a sort of fuzzy model, ready to be converted in MATLAB script commands.

# TOOLS AND TRANSFORMATIONS

The tools chosen for the project are the ones presented during the course, namely Eclipse Modeling Tools and the plugins Acceleo and QVTo, plus the plugin BPMN2 to design the starting model and retrieve the BPMN metamodel specification. The first step will consist in a M2M transformation that will involve this starting model and will result in a fuzzy model, regulated by the custom metamodel constraints, that will be operated with the help of QVTo. The second step will be to translate the fuzzy model in a .m file, containing executable commands that will allow the MATLAB environment to reproduce the model in Simulink, ready for the simulation steps. For

this M2T transformation, Acceleo will be the chosen tool. Then, it will be possible to write a script in Eclipse to batch the two transformations and directly obtain the script file from the BPMN model.
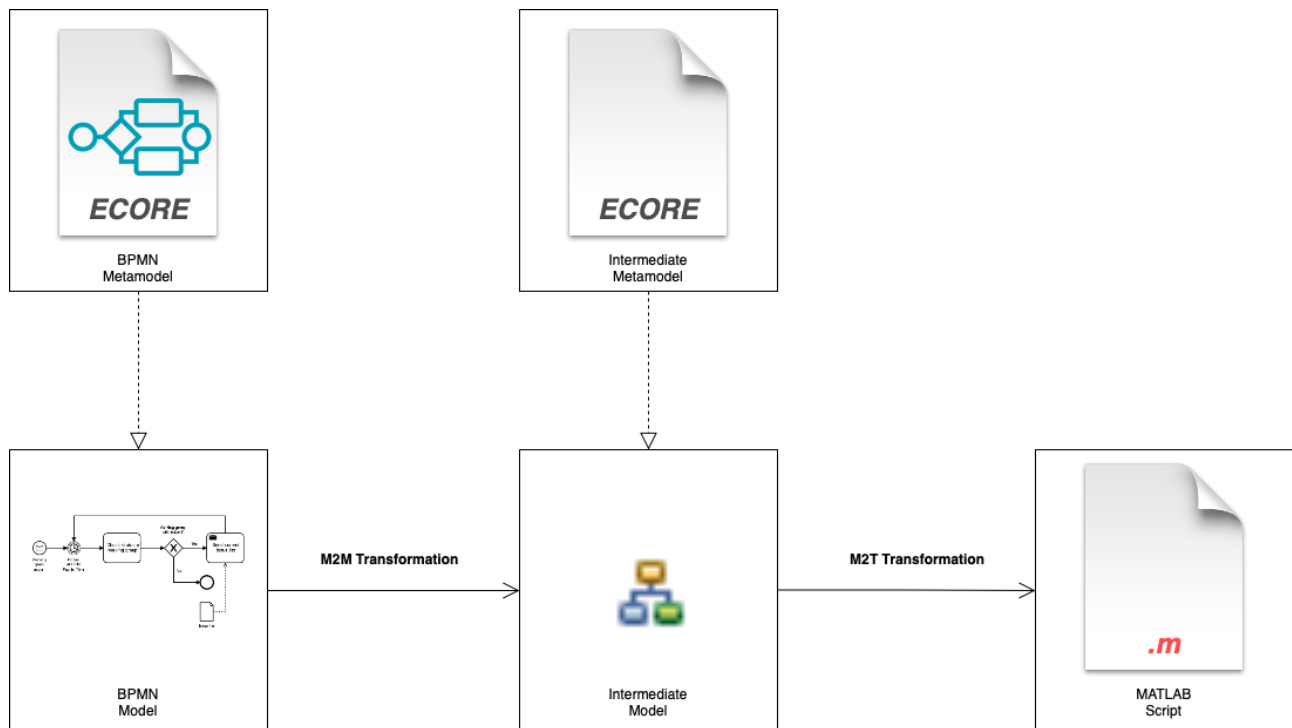


Fig.3 Overview of the Transformations to be implemented

# REFERENCES

[1] Jalali, Amin & Wohed, Petia & Ouyang, Chun. (2012). Aspect Oriented Business Process Modelling with Precedence. Lecture Notes in Business Information Processing. 125. 10.1007/978-3-642-33155-8_3.