



## Creating Collaboration Instruments in the Parametric Design Context

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### Abstract

This paper outlines the development of a new open-source plugin for collaboration workflow within the parametric design paradigm. Processes of informational exchange support the integration approaching workflows for processing performative design between engineers and architects.

**Keywords:** parametric engineering; finite element; collaboration; parsing algorithms.

### 1 Introduction

Computer science is the connecting link of the collaborative workflow between performative engineering and architectural design, which allows seamless division of labour. Merging that interdisciplinary expert knowledge, the development of the state-of-the-art of buildings obligates the collaborative processes supported throughout direct information exchange. Parametric design paradigm correlates the performance of algorithms within a model using collaborative control. Providing information about the structural behaviour of a system, all of the plugins automate structural analysis procedures and provide immediate information exchanges. The sophisticated performative design processes become common in the parametric environment and the information exchange is accelerated. Within this paper an open-source algorithmic solution is presented. The plugin for parametric structural calculation uses existing finite element methods, which verify the results subsequently. It determines the results according to building codes, such as Eurocode or International Building Code.

### 2 Guidelines

Considering the technological-advanced architectural and engineering practice, the importance is strengthened by the evaluation and usage of technologies. The parametric design methods require sophisticated, but efficient algorithms in order to induce the workflows. For example, if an architect creates a design proposal, the engineer's task is to find the best matched structural design solution. Simultaneously matching up the aesthetic appearance with an intelligent structural design solution is the aim of both parties. Consequently both subjects are considering data as communication medium. In contrast to architectural parametric tools and data, processing structural design obligates a different data-structure. Embedding the data into the parametric environment allows a direct link between the architectural and structural models. In combination with a visual programming language, the structural analysis processes such as support definition, force application and the actual calculation can be controlled automatically.