

# VIVO - Visualizing Harmonic Progressions and Voice-Leading in PWGL

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We present a novel approach that allows to visually define harmonic progressions and voice-leading rules. The heart of this system is a new tool called VIVO (Visual VOice-leading). VIVO comprises of a compiler and a collection of visualization devices. VIVO takes advantage of several music related applications collected under the umbrella of PWGL (PWGL is a free cross-platform visual programming language for music and sound related applications). Our music notation application--Expressive Notation Package or ENP--is used to build a user-interface that, with the help of common practice notation, allows to visually define harmony and voice-leading rules according to a simple protocol. These visualizations are converted to textual rules by the VIVO compiler. Finally, our rule-based compositional system, PWGLConstraints, is used generate the final musical output using these rules.

The musical problems that are interesting in terms of musical constraints programming are typically very demanding. Here, harmony, melody, voice-leading, and counterpoint provide challenges not only in an aesthetic sense but also in terms of a formal definition. Defining rules that solve a certain compositional or music analytical problem is a time consuming task and requires a lot of both musical and programming expertise.

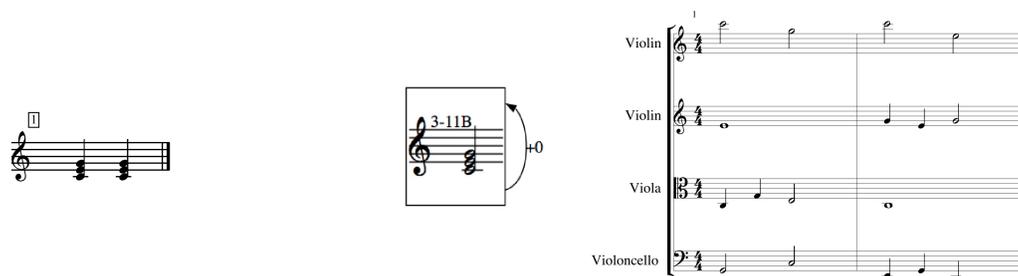
To address this problem we present the VIVO system that--already in its preliminary stage--allows to visually define rudimentary counterpoint. Using music notation as a frame-work for constructing the user-interface for VIVO provides several advantages:

- it is easy to write the rules, i.e., the user sees the exact musical context the rule is applied to;
- it is possible to verify the correctness of the data by 'listening' to the rules;
- it is straightforward to edit, add and remove data; and
- the user can easily make subsets of the rule set.

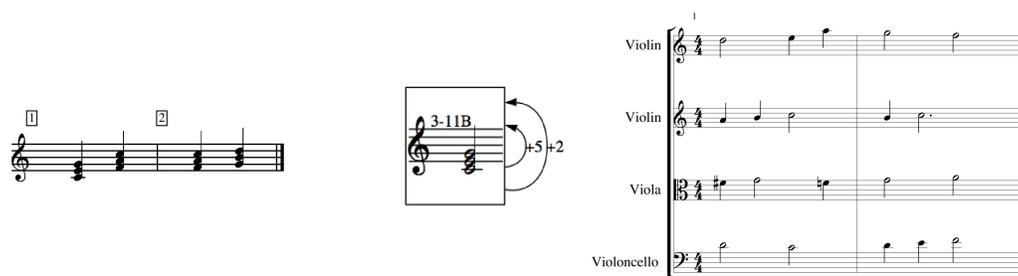
By entering musical material into the score makes it possible to define given aspects of harmony and voice-leading. The approach presented here resembles the traditional teaching situation where a teacher or a textbook gives out examples of correct use of harmonic

## A. Harmony

### 1. Defining a Harmony

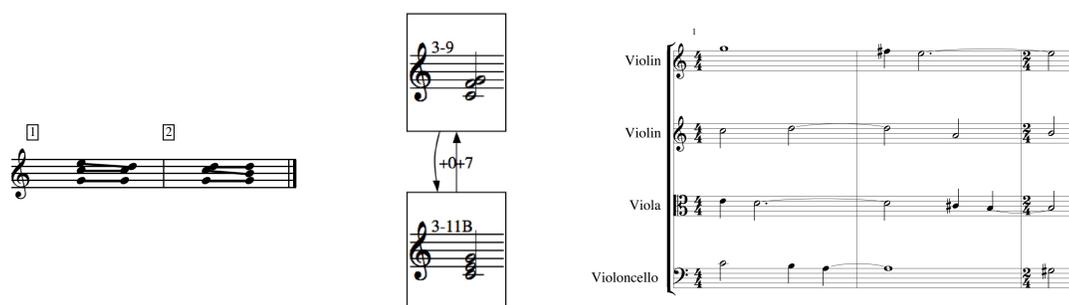


### 2. Defining a Harmonic Progression (I-IV-V)



## B. Voice-leading

### 1. Preparing and Resolving a Suspension



### 2. Preparing and Resolving Dominant Seventh Chords

