Organ Donor Software Components

Here's a diagram of what the automatic
composition software looks like on the inside.
Each part has a job to do.

transpose(signature, number)

A function that sends one pitch class to another by adding a constant. That is, pc_new = pc_old + t, mod 12.

minweight(signature)

A function that takes a signature and finds the rotation of that signature that is of minimum weight. This means the rotation that is most "left-packed".

signature_complement(signature)

A function that inverts a signature. Absence or presence of a note is reversed.

weigh(signature)

A function that takes a signature and returns a value that corresponds to how "left packed" it is. The weight of the signature is used in determining minimum weight, and therefore prime form.

invert(signature)

A function that sends one pitch class to another by subtracting from a constant. That is, pc_new = n_const - pc_old, mod 12.

transposition_level(signature)

A function that takes a signature and returns the number of shifts required to get a minimum weight signature. This integer is called the Transposition Level.

left_justify_signature(signature)

A function that takes a signature and left justifies all the values. The entire signature is moved to the left until the first non-zero value is in the zeroth position in the vector.

signature

A signature is a vector formed by taking the coefficients of the polynomial representation of an element in the finite field. Each non-zero value in the vector stands for the presence of that particular pitch or pitch class. The signature represents a chord.

left_justify_element(element)

element

An element is a single member of the finite field GF(2^12). An element is an abstract representation of a chord.

pitches_to_signature(chord)

primeform(signature)

find_signatures(primeform)

common_tone(signature)

A function that takes two signatures and returns the positions where there are tones in common.

prime form

A Prime Form is a transformation of a collection of pitch classes that allows us to treat classes of pitch class sets as equivalent at an abstract level, while highlighting important musical properties of the collections.

signature_to_pitches(signature)

chord

A chord is a list of pitch classes. The value of the pitches corresponds to the indices of the signature that contain a non-zero value, indicating the presence of a pitch class.

invindvect(primeform)

pitch

a pitch is the perceived frequency of a single, individual musical note. For example, Middle C on the piano keyboard. In general, the pitches we talk about will arise from dividing the musical octave into 12 equal parts (12-tone equal temperament).

intvect(primeform)

Interval Vector is a list telling how many times each interval class occurs between all members of a pitch class collection.

Inversional Index Vector is a list telling how many times each inversional index class occurs between all elements of a pitch class collection.