REPRESENTATION

****harm** — representation for Western functional harmony

DESCRIPTION

The ****harm** representation provides one method for encoding Western functional harmony. In the ****harm** representation, chords are normally identified within a key context — such as G minor, or A-flat major. Keys are normally indicated using the "key" tandem interpretation. If no key indication is provided, the harmony representation is deemed both key-independent and mode-independent (neither major or minor). (Key-independent representations may be useful for comparing harmonic patterns between groups of works in varying keys.) Changes of key can be defined at any point in a ****harm** representation. The defined key context remains in effect until the occurrence of another key-interpretation or until the key context is specifically "undefined": the reserved key-interpretation `*?:` can be used to "undefine" the key context.

Chords are labelled according to four attributes: (1) chord root, (2) chord type, (3) inversion, and (4) chord alterations.

Chord roots are identified according to the diatonic scale degree. Scale degrees are indicated through the use of Roman numerals: I for tonic, II for supertonic, III for mediant, etc. The specific roots will vary according to whether the key is major or minor. For example, in the key of C major, the III chord will have E as the root, whereas in the key of C minor, the III chord will have E-flat as the root. By definition, the scale degrees of the minor key are assumed to correspond to the pitches of the *harmonic minor* scale. Notice that without a major or minor mode distinction, the roots of the *III* and *VI* chords are ambiguous — they simply denote mediant and submediant chords respectively.

Of course musical passages may contain chords having altered roots. Raising or lowering the root is indicated by prepending a minus sign (-) or octothorpe character (#) respectively. For example, in the major key, a chromatic mediant chord based on the lowered sub-mediant would be encoded as *-VI*. In a notated score, the lowering of the root may be achieved by adding a flat or by adding a natural — depending upon the prevailing key; however, the specific accidental used to lower the root is irrelevant to ****harm.** For example, in the key of C minor, a minor chord having E-natural as a root would be encoded as *#iii*.

In the case of triads, there are four possible chord types: major, minor, diminished, and augmented triads. Upper- and lower-case numerals are used to indicate whether the third of the chord is major or minor. For example, the supertonic chord in a major key would normally be indicated as "ii". In short, major and augmented triads are indicated through a upper-case Roman numeral, whereas minor and diminished triads are indicated through a lower-case Roman numeral. Diminished chords are indicated by the explicit addition of the small letter 'o' — for example, the diminished triad with a root on the leading tone is denoted as "viio." Augmented chords are indicated by the explicit addition of the plus sign

(+) — e.g. "III+" for the augmented triad on the mediant degree (common in the minor key), or "V+" for the augmented altered dominant chord.

In **harm, inversions of chords are indicated using lower-case alphabetic characters: first inversion - "b"; second inversion "c"; third inversion - "d"; etc. Root position is implied, so in the absence of a letter designation (a,b,c ...) the token *IV* means a IV chord in root position. Figured-bass notation is not used in **harm because it proves inconsistent in the spelling of extended tertian chords. In the case of a fully spelled 13th chord in root position, for example, the figured bass would be 1-2-3-4-5-6-7. However, this same figured bass would apply to all inversions of the 13th chord, and so it fails to distinguish any of the possible inversions. In **harm, the first inversion of a 13th chord is signified by the letter "b" whereas the hypothetical 6th inversion of a 13th chord is signified by the letter "f".

Seventh chords are indicated by the addition of the number "7" — as for example in the dominant seventh chord: V7. Ninth, eleventh, and thirteenth chords are similarly represented: e.g. V9, V11, V13. Such extended tertian chords can be encoded in more detail by indicating whether the interval is major or minor — signified by use of the upper- or lower-case letter "M." For example, a dominant minor ninth chord would be represented by "Vm9" whereas a dominant major thirteenth chord would be represented by "VM13". When the interval is not explicitly indicated as major or minor, it is assumed that the actual spelling is in accordance with the prevailing key signature. For example, V9 is equivalent to Vm9 when the prevailing key is minor.

If it is necessary to specify more precisely the actual intervals involved in an extended tertian chord, all intervals may be included: Vm9P11m13. When more than one interval is given, the intervals must be specified in ascending order and must include a major or minor designation. Where intervals are perfect, the upper-case letter "P" is used. Where intervals are augmented, the upper-case letter "A" is used. Where intervals are diminished, the upper-case letter "D" may be used. (It is common practice to represent diminished intervals using the lower-case letter d; in **harm, however, this would be indistinguishable from the designation for third inversion.) Thus the half-diminished seventh chord would normally be represented as viiom7, whereas the full-diminished seventh chord would be represented as viioD7. Doubly-augmented and doubly-diminished intervals can use "AA" and "DD" respectively.

Of course it is rare that a musical passage or work remains within a single key. The use of secondary dominants and modulations requires that some means be provided for indicating shifting key areas. When shifts of key are sanctioned, these should normally be encoded using an "X of Y" approach — e.g. V of V. In the **harm representation, such shifts are indicated via the slash character (/). For example, a dominant seventh chord on the supertonic degree can be represented as V7/ii. If a passage modulates to the subdominant and remains there for some time, chord sequences can be identified as /IV — e.g. V7/IV, I/IV, vi/IV, ii/IV, V/II/IV, II/IV, etc. (Notice the use of I/IV rather than IV; in long sequences of chords it is preferable to encode successive chords within the new key area.) There is no limit to the number of key-area shifts specified in a harmonic token: e.g. V/V/V/V/V/I is syntactically legal.

In traditional harmony, a variety of special chords may be encountered — such as the

Neopolitan chord, and the "ethnic sixth" chords: Italian, French, and German. The Neopolitan chord is a major triad whose root is the lowered supertonic; it is represented in ****harm** by the reserved upper-case letter "N". The Neopolitan chord normally appears as a first inversion chord, so the Neopolitan sixth chord would be represented as "Nb". Notice that the Neopolitan sixth chord is equivalent to "-IIb". The Italian, French, and German augmented sixth chords are represented as "Lt", "Fr", and "Gn" respectively. In addition, the "Tristan chord" (A4m7m10 above bass pitch) has a special designation as "Tr".

Occasionally, chords may appear using *enharmonically* equivalent spelling. Such chords can be encoded by using the enharmonic prefix of the tilde character (~). For example, if a Neopolitan sixth chord is spelled using the raised tonic rather than the lowered supertonic, the chord may be encoded: ~Nb.

In other cases, it may be entirely impossible to identify a chord in terms of traditional Western functional harmony. Such chords may be encoded by specifying a set of intervals above the bass pitch — with the question-mark prefix. For example, in the key of A major, the chord C4, E4, F#4, G#4, D5 can be represented as: ?-IIIM3A4A5M9. Notice that this representation reverts to a descriptive approach and so is no longer truly "functional."

Chord identifications may be characterized as (1) explicit, (2) implied, or (3) alternate. Explicit harmonies occur when most or all of the chordal tones are present. In some cases (such as melodic lines) the harmonies may be implied rather than explicit. Implicit harmonies are indicated by placing the chord signfied in parentheses (). In other circumstances, there will be more than one way of labelling a given harmony. Alternate harmonies are indicated through the use of square brackets []. All other indications are assumed to be explicit. In the case of bi-tonal works, the user may elect to pair explicit and alternate encodings, e.g. iii[v/vi], or make use of two independent ****harm** spines. Two or more ****harm** spines may be necessary in the case of polytonal works.

Barlines are represented using the "common system" for barlines — see **barlines (2)**.

FILE TYPE

It is recommended that files containing predominantly `**harm` data should be given names with the distinguishing '.hrm' extension.

SIGNIFIERS

The following table summarizes the ****harm** mappings of signifiers and signifieds.

–	lowered root
#	raised root
+	augmented triad
o	diminished triad
I	chord degree (major)
i	chord degree (minor)
V	chord degree (major)
v	chord degree (minor)
b	first inversion chord
c	second inversion chord
d	third inversion chord
e	fourth inversion chord (ninth chords)
f	fifth inversion chord (eleventh chords)
g	sixth inversion chord (thirteenth chords)
r	rest
7	added seventh
9	added ninth
11	added eleventh
13	added thirteenth
.	null token
/	secondary function, e.g. V "of" vi
m	minor interval
M	major interval
P	perfect interval
A	augmented interval
D	diminished interval
AA	doubly-augmented interval
DD	doubly-diminished interval
Nb	Neopolitan sixth chord
N	Neopolitan chord in "root position"
Lt	Italian augmented sixth chord
Fr	French augmented sixth chord
Gn	German augmented sixth chord
Tr	Tristan chord
~	enharmonically-spelled chord
( )	implicit harmony
[ ]	alternative functional harmony label
viiom7	half-diminished seventh chord
viioD7	full-diminished seventh chord

Summary of ****harm** *Signifiers*

EXAMPLES

A sample document is given below:

```
**harm
*C:
!! An example.
=1
I
IVb
.
V7/V
=2
I/V
vib/V[iiib]
ii/V[vi]
viioD7/V
=3
V[I/V]
.
IV
Nb
V7d
=4
!! Minore
*c:
i
?-IIIM3A4A5M9
#iiiob
IV
*?:
Lt
=5
ic
Vm9
I
==
*-
```

PERTINENT COMMANDS

Currently, no special-purpose Humdrum commands produce ****harm** as output, or process ****harm** encoded data input.

TANDEM INTERPRETATIONS

The following tandem interpretations can be used in conjunction with ****harm**:

MIDI channel	`*Ch1`
meter signatures	`*M6/8`
key signatures	`*k[f#c#]`
key	`*c#:`

Tandem interpretations for ****harm**

SEE ALSO

barlines (2), ****embel** (2), ****kern** (2)