Variations – Supplemental Practice Exercises (Part I)

Here are a few examples for you to try. We'll go over these in class, as needed. Solutions are given on pages 2-4 of this handout.

For each, I'll just give you a "melody" as an ordered list of notes. Your job is to apply the given variation to each one, to find the new variation. You can write just write them as a list of notes, or (if you prefer) on a music staff. You can find some sheet music on the "notes" section of the class web page (click the "free sheet music" link).

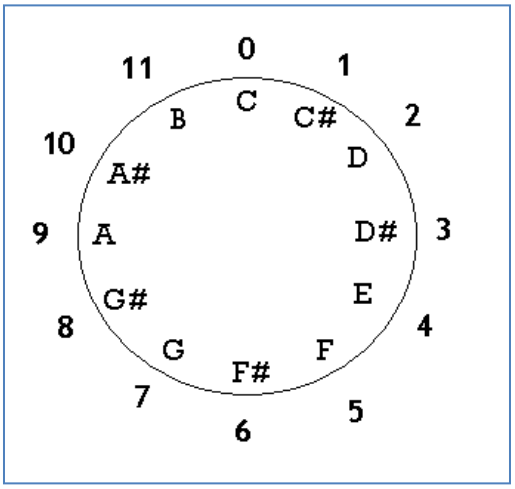
Reminder: The notation "I," without a subscript, always refers to inversion centered at C – this is the inversion that is defined in the text.

1. G, F#, A, G, G, C – find: T_4, T_4R, and T_4I
2. D, C, B, A, A, G, B – find T_6, T_6I, and IT_6
3. D, D, C#, A, B, C#, D – find IR and T_2IR
4. E, G, D, G, C, D, E, F, D, G – find $I, R,$ and T_8

1. G, F#, A, G, G, C – find: T_4, T_4I, and IT_4

Recall that you find T_4 by raising each note by four semitones.

T_4: B, A#, C#, B, B, E



T_4I: To find this variation, apply the inversion to T_4, which you already found. Recall that you find the inversion by "reflecting" each note across a "C" – or, equivalently, by "reflecting" each note horizontally across the "musical clock" diagram.

T_4: B, A#, C#, B, B, E

T_4I: C#, D, B, C#, C#, G#

IT_4: This is the inversion followed by T_4. It's tempting to just assume that the answer here will be same as the answer for T_4I, but that assumption would be incorrect! To see for yourself, first find the inversion of the original melody:

Melody: G, F#, A, G, G, C
Inversion: F, F#, D#, F, F, C

…then, apply T_4 to the result…

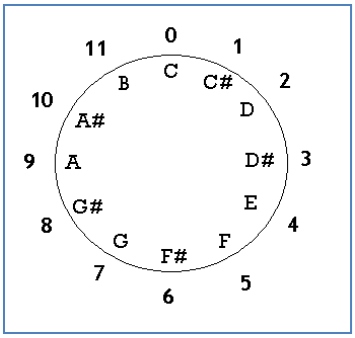
I: F, F#, D#, F, F, C
IT_4: A, A#, G, A, A, E

Comments:

- Note that the results of T_4I and IT_4 are NOT the same! This shows that inversions and transpositions are not "interchangeable" (or "commutative," to use the mathematical term) – the order in which they're applied does matter!
- However, note that there is some similarity between the two answers…
  IT_4: A, A#, G, A, A, E
  T_4I: C#, D, B, C#, C#, G#

  Note the "jumps" between consecutive notes: first up one semitone (from A to A#, or from C# to D), then down two semitones (from A# to G, or from D to B), and so on. This similarity is consistent with how transpositions behave; in fact, these two answers are transpositions of each other. Specifically, if you were to transpose the first variation (IT_4) up by four semitones, you would end up with the second variation (T_4I). .

2. D, C, B, A, A, G, B – find transposition T_6, T_6I, and IT_6



T_6: G#, F#, F, D#, D#, C#, F

T_6I: E, F#, G, A, A, B, G

To find IT_6, we must start with the inversion of the original melody, and then transpose that result up by 6 semitones:

I: A#, C, C#, D#, D#, F, C#

IT_6: E, F#, G, A, A, B, G

Comment: We noted earlier (see the comments after #1 on the previous page) that IT_n isn't usually the same as T_nI. However, an exception to this rule is when $n = 6$ - that is, T_6I and IT_6 DO give us the same variation; this always works! (Why is T_6 the exception to the rule?)

Note: Exercise #2 originally asked about T_7, T_7I, IT_7 rather than the variations shown here. (This was a typo caught by a student – thanks Justin!) Here are the answers for those variations…

T_7: A, G, F#, E, E, D, F#

T_7I: D#, F, F#, G#, G#, A#, F#

IT_7: F, G, G#, A#, A#, C, G#

3. D, D, C#, A, B, C#, D

T_{-5} : A, A, G#, E, F#, G#, A

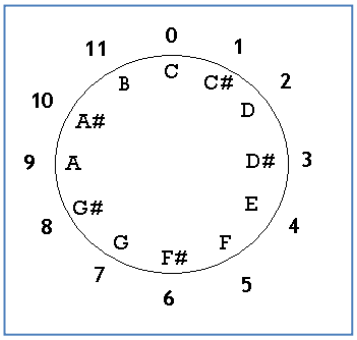
Comment: as noted in class, this transposition is the same as T_7 (since -5 + 12 = 7; that is, -5 and 12 are "equivalent" under the mod 12 arithmetic rules. So, we'll usually call this variation T_7 rather than T_{-5} (or T_{19}, T_{31}, T_{-17}, or any other equivalent transposition) from now on.

I: A#, A#, B, D#, C#, B, A#

IR: A#, B, C#, D#, B, A#, A#

Comment: R denotes the "retrograde," which simply reverses the order of the notes in a melody.

4. E, G, D, G, C, D, E, F, D, G – find $II, RR,$ and T_8



Answers: II and RR both leave us with the original melody; that is, I is its own opposite, and R is its own opposite:

I: G#, F, A#, F, C, A#, G#, G, A#, F
II: E, G, D, G, C, D, E, F, D, G

R: G, D, F, E, D, C, G, D, G, E
RR: E, G, D, G, C, D, E, F, D, G

T_8: C, D#, A#, D# G#, A#, C, C#, A#, D#