

## 6.16 Surviving Serialism 4: Derivation, Invariance, Combinatoriality

### Derived Rows

**Derivation** = Creating a twelve-tone row by applying a combination of transposition, inversion, and/or retrograde to a set containing less than twelve pitch classes. **Trichords** (3 pitch classes) are most common, but **dyads** (2 pitch classes), **pentachords** (4 pitch classes) and **hexachords** (6 pitch classes) are possible. **Anton Webern** favored this technique.

One of many possibilities is shown in this row from Webern's *Concerto Op. 24*:

The image shows a musical staff with a treble clef and a key signature of one flat. The notes are: G4, A4, Bb4, C5, Bb4, A4, G4, F4, E4, D4, C4, B3. Brackets underneath group the notes into four trichords: trichord 1 (G4, A4, Bb4), trichord 2 (Bb4, C5, Bb4), trichord 3 (Bb4, A4, G4), and trichord 4 (A4, G4, F4).

Trichords 2, 3, and 4 are all **derived** from trichord 1 by various operations:

The diagram shows trichord 1 (G4, A4, Bb4) at the top. Three arrows point down to trichord 2 (Bb4, C5, Bb4) with the label "retrograde inversion, transposed". Three arrows point down to trichord 3 (Bb4, C5, Bb4) with the label "retrograde, transposed". Three arrows point down to trichord 4 (A4, G4, F4) with the label "inversion, transposed".

### Invariance and Combinatoriality

**Invariance** = A twelve-tone row that recreates 1 or more subsets (dyads, trichords, pentachords, or hexachords) after undergoing some combination of transposition, inversion, and/or retrograde.

**Derived rows** often exhibit **invariance** because of the close relationships among the subsets.

Below, inverting the row from Webern's *Concerto Op. 24* and transposing up one half step gives the trichords from P0 in reverse order. They are thus **invariant trichords**.

The image shows two musical staves. The top staff is P0 (G4, A4, Bb4, C5, Bb4, A4, G4, F4, E4, D4, C4, B3). The bottom staff is I1 (Bb4, C5, Bb4, A4, G4, F4, E4, D4, C4, B3, A3, G3). Arrows connect the trichords of P0 to the corresponding trichords of I1 in reverse order: P0 trichord 1 to I1 trichord 4, P0 trichord 2 to I1 trichord 3, P0 trichord 3 to I1 trichord 2, and P0 trichord 4 to I1 trichord 1.

**Combinatoriality** = A type of invariance in which a subset of a row combines with subsets of transpositions, inversions, and/or retrograde inversions of the row to create a new twelve-tone row.

**Hexachordal combinatoriality** = The most common type of combinatoriality, combining the **first hexachord** of one row form with the **first hexachord** of a different row form (transposition, inversion, and/or retrograde inversion) to create a new row. In other words, the first six pitch classes of one row form are the last six of a different row form, **though not necessarily in the same order**. P0 and I1 above happen to exhibit **hexachordal combinatoriality** in addition to the **trichord invariance** discussed above:

The image shows a musical staff with a treble clef and a key signature of one flat. The notes are: G4, A4, Bb4, C5, Bb4, A4, Bb4, C5, Bb4, A4, G4, F4. Brackets underneath group the notes into two hexachords: "P0, hexachord 1" (G4, A4, Bb4, C5, Bb4, A4) and "+ I1, hexachord 1 (like P0, hexachord 2, trichords reversed)" (Bb4, C5, Bb4, A4, Bb4, A4).

### All-Interval Rows

**All-interval row** = Any row that contains one of each type of **ascending interval from 1 to 11 half steps**. These rows **may or may not** be derived or combinatorial.

All-interval row from *Lyric Suite* by Alban Berg. Numbers indicate **ascending** half steps.

The image shows a musical staff with a treble clef and a key signature of one flat. The notes are: G4, A4, Bb4, C5, Bb4, A4, G4, F4, E4, D4, C4, B3. Numbers above the notes indicate ascending half steps: 11, 8, 9, 10, 7, 6, b5, 2, 3, 4, 1.