Some raw material on mathematical and musical beauty

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Deryck Cooke, *The Language of Music* (1959)

- The purely 'architectural' aspect is found in a limited number of contrapuntal works built out of material which is not emotionally expressive. (p. 33)
- Form … is simply expression, and … technique on any scale is simply the means of achieving this expression. (p. 220)
- If music does express spiritual or mystical intuitions, it must do so through the emotional terms of musical language. (p. 272)

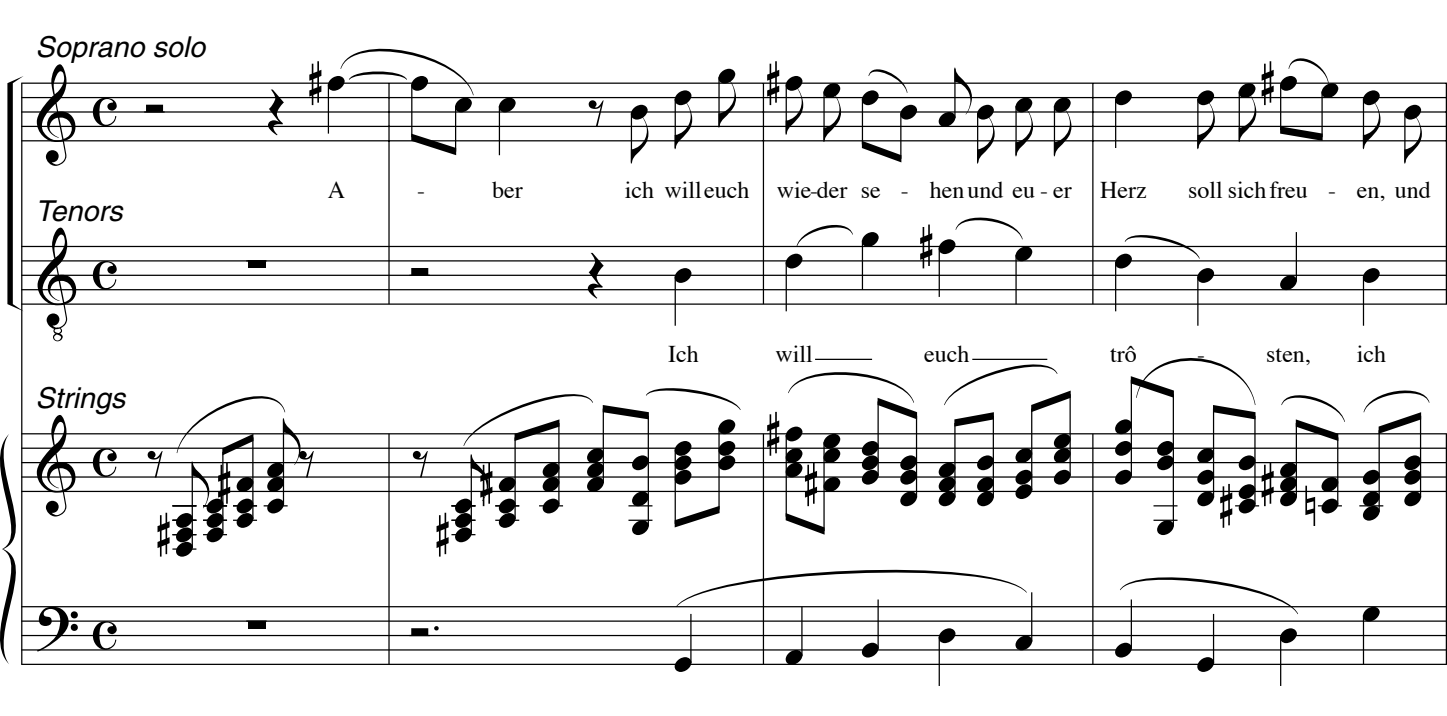
Cooke's view is that apart from 'a limited number of contrapuntal works', music achieves its aims through using certain configurations of notes to express emotions.
He sees little role for mathematical patterns in music.

Beauty is in the ear of the listener.
My ear is totally different from Cooke's.
For me, geometry is part of the fabric of music, whether or not it expresses emotions.

This talk will present some examples. (For copyright reasons some scores are missing in this file.)

1. Brahms, 'Ihr habt nun Traurichkeit', Ein Deutsches Requiem, The Schutz Choir of London, The London Classical Players, cond. Roger Norrington, soprano Lynne Dawson

Figure repeated at half speed in lower voice, for narrative reason


Soprano solo
A - ber ich will euch wie-der se - hen und eu - er Herz soll sich freu - en, und
Tenors
Ich will euch trô - sten, ich
Strings

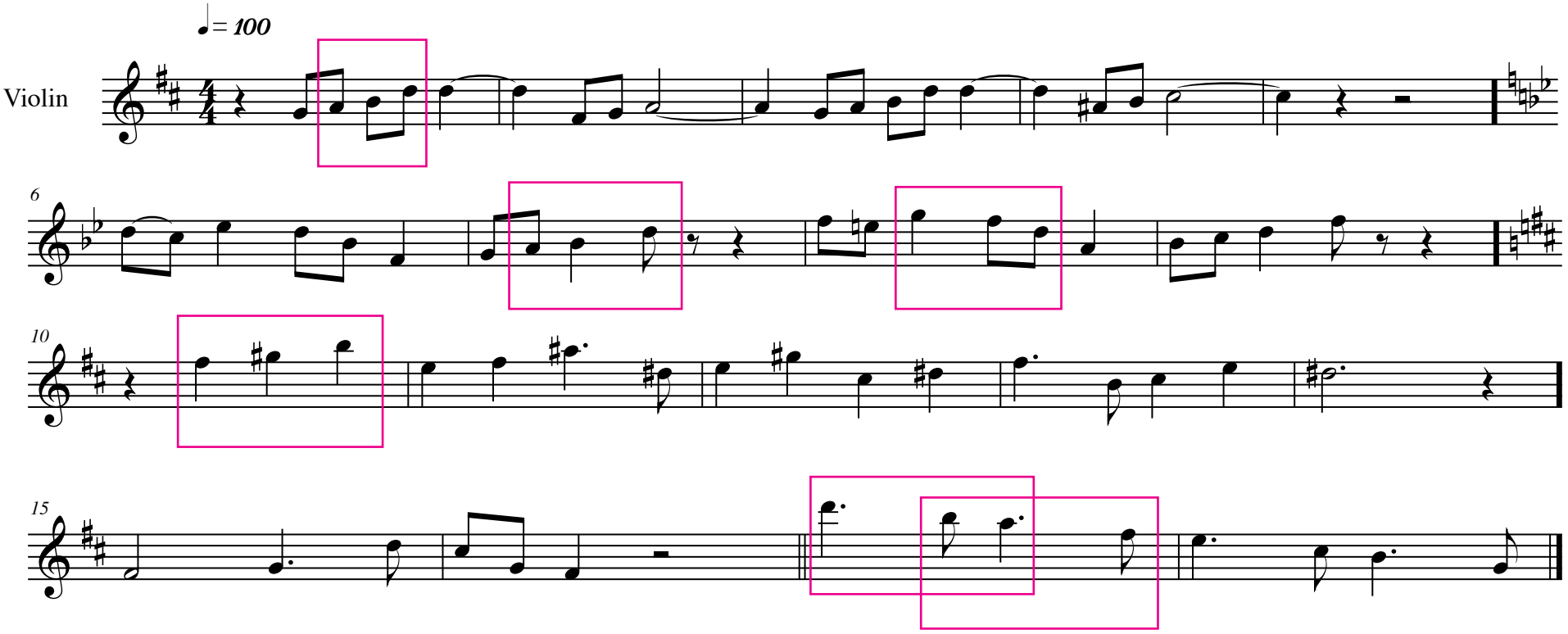
2. Elgar, Violin Concerto, St Louis Symphony Orchestra cond. Leonard Slatkin, violin Pinchas Zukerman

Motif geometrically transformed in various ways, some iterated, giving a unity to the work

Score

Elgarvc

Elgar

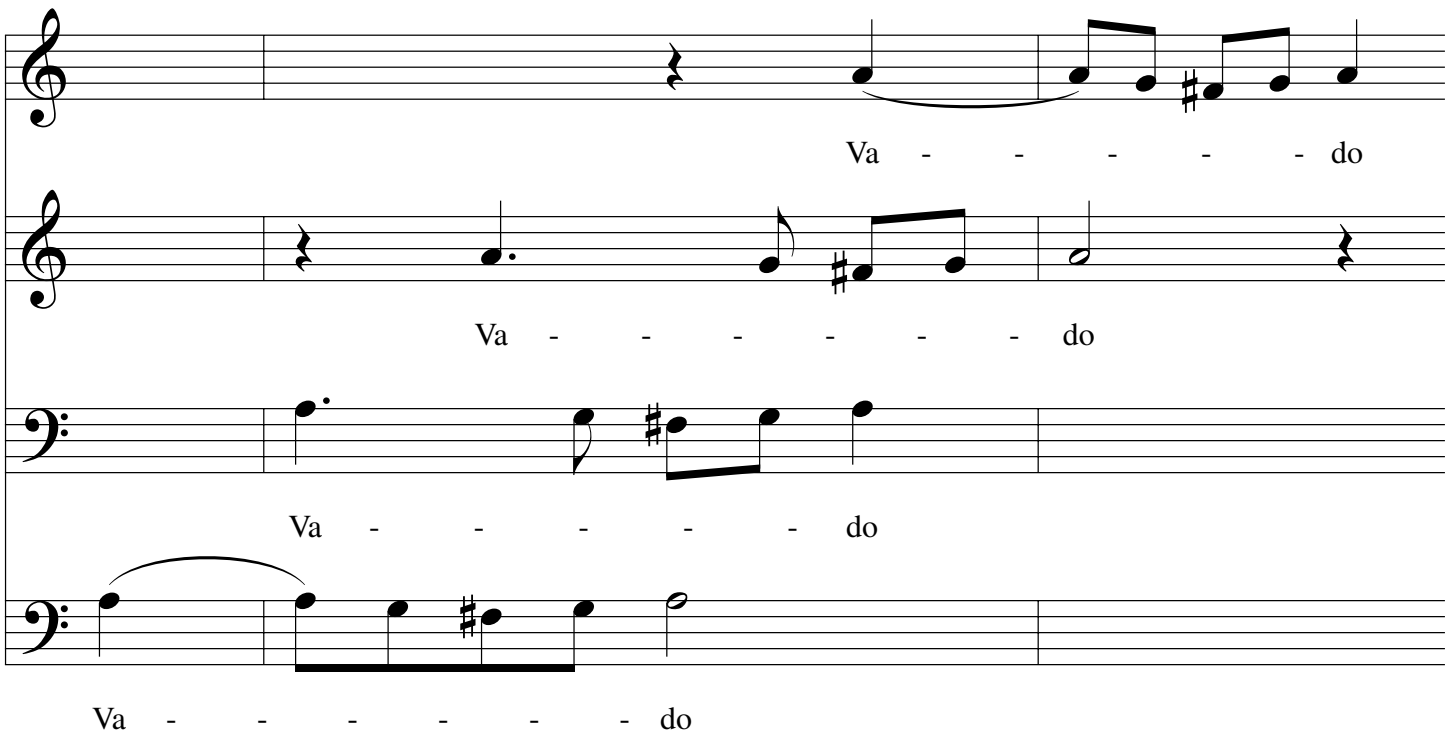


3. Messiaen, ‘Regard du Fils sur le Fils’, Vingt Regards sur l’Enfant-Jésus, John Ogdon

Rhythm repeated in ratio 2:3, almost inaudible and significant chiefly for the composer

4. Byrd, ‘Non vos relinquam’, Motets, Durham Cathedral Choir cond. James Lancelot

Motif repeated several times rising in pitch, to represent ascension; clear to performers if not to listener


Va - - - - - - do
Va - - - - - - - do
Va - - - - - - do
Va - - - - - - - do

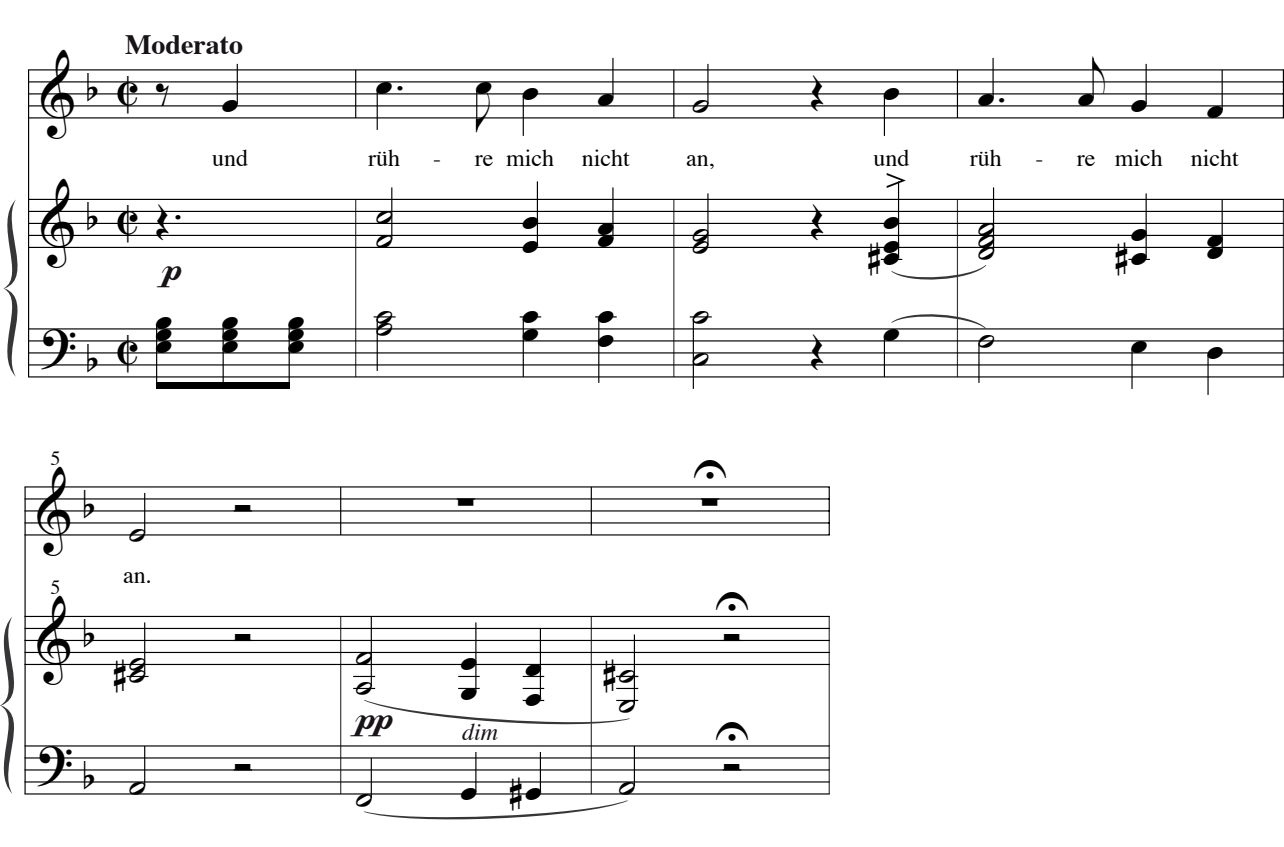
5. Josquin Desprez, ‘Huc me sydereo’, Orlando Consort

The earliest unambiguous example of pictorial use of the musical time-pitch plane, here to depict a meteor shower

de - scen - - de - re ius - sit O - lym - po

6. Schubert, ‘Der Tod und das Mädchen’, Bryn Terfel, acc. Malcolm Martineau

Pincer movement in the musical plane


Moderato
und rüh - re mich nicht an, und rüh - re mich nicht
p
5
an.
5
pp
dim

7(a). Paganini, 24th Capriccio for Violin, Salvatore Accardo

7(b). Rachmaninov, Variation 18, Rhapsody on a Theme of Paganini, St Louis Symphony Orchestra cond. Leonard Slatkin, piano Abbey Simon

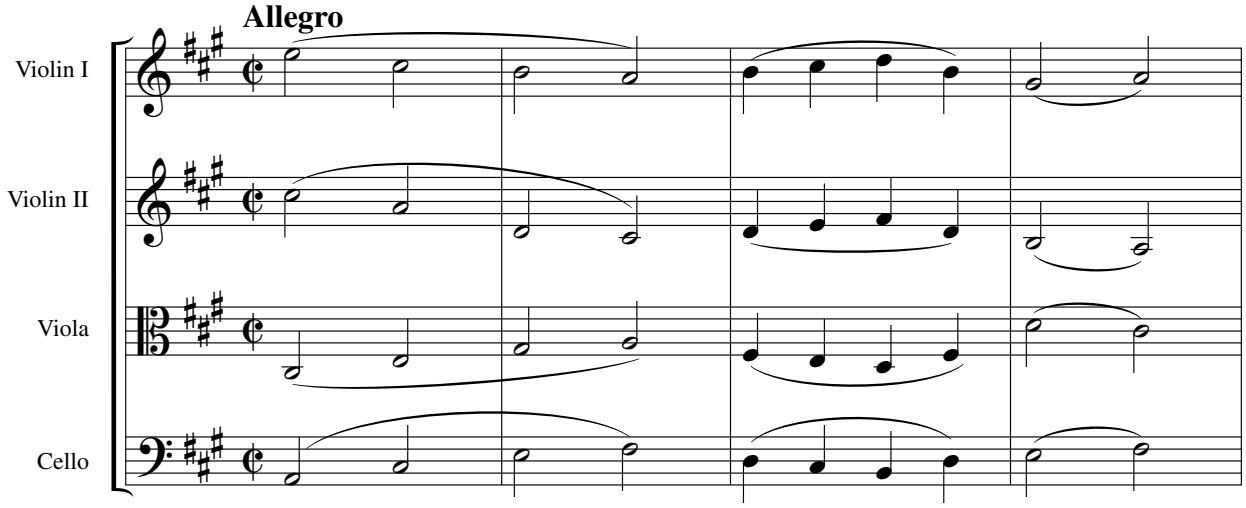
The later and more popular tune is the earlier one with pitches reversed in the musical plane (plus some slight adjustments)

8. Berio, Cries of London, Swingle II

Though rotations in the musical plane are musically meaningless, horizontal transvections occur naturally

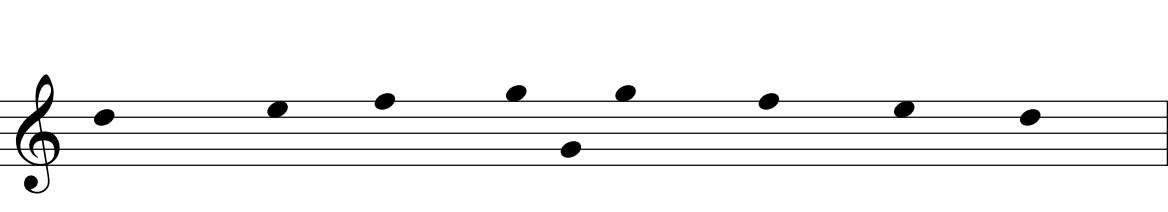
9. Mozart, Clarinet Quintet, synthesizer

The opening bars are almost perfectly symmetrical under pitch reversal


Allegro
Violin I
Violin II
Viola
Cello

10. Handel, Hallelujah Chorus, Messiah, The Scholars Baroque Ensemble

Motif symmetrical under time reversal, used as symbol of power as in large symmetrical civic buildings



11. Janacek, ‘Veruju’, Glagolitic Mass, Royal Philharmonic cond. Rudolf Kempe

One of the very few examples of a figure symmetrical under the full Klein 4-group. Why here, and why so rare elsewhere?

12. Rimsky-Korsakov, Suite from the Golden Cockerel, Armenian Philharmonic Orchestra cond. Loris Tjeknavorian

For narrative reasons the composer uses the contrast between a motif with an orientation and its mirror image

DANGER
PEACE

Reference

- Wilfrid Hodges, 'The geometry of music', in *Music and Mathematics: From Pythagoras to Fractals*, ed. John Fauvel et al., Oxford University Press 2003, pp. 91–111.

The proceedings of a conference on music and mathematics, Oxford 1991. The book contains many further references.