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Part A overview and analysis of Trionys Vector Alpha piece

Trionys contains extreme shifts in energy throughout each movement, thus making this piece globally dynamic. For example, whereas Filigran is a low energy movement, Finale is a high energy movement. However, in each movement there are discrepancies to the global dynamics. These dynamics include elements such as local staticity and local surprise. Examples of globally and locally static movements are found in Filigran, where the energy level is continuous from beginning to end; Finale can also be considered globally static, as it maintains the same energy level throughout the whole movement (discussed in Finale section). Some movements contain global dynamics such as Urgrund-Verweht. From 0:00 to 1:03:61, the frequency activity remains between 0 and 301Hz, at a low intensity level. This droning, low frequency sound, is suddenly succeeded by a high intensity, high frequency conglomeration that lasts from 1:03:61 to 1:13:52 (residual reverberation sounds after). In between these two sounds, there is no crescendo, only a huge leap between the two. In the same movement, there are two leaps of this nature: another leap into high intensity occurs at 1:38 and lasts until 1:50. Other elements of local surprise include the addition of instruments into the acoustic space. For example, at 2:49:39, 3:02 and 3:19, the cymbal is struck and resonates loudly above the other instruments. These elements cause the movement to be globally dynamic.
Trionys (Movements 1 to 13) contains 3 distinct instrumental sounds (bells and chimes can be heard as well). The first is the percussion, then the piano and finally the violin. Throughout each movement the instruments communicate or demonstrate a variance in communication. In some cases there is one particular instrument taking the lead and others will follow. For example: In A-Trractor the piano and the violin have a relationship where the violin follows after the piano's lead, mimicking its energy pattern and pitch class. Thus they are creating a consonance and are also bound by the same activity level. However, sometimes the instruments will compete for the lead creating high energy and dissonance. In Mashinen the violin and drums create high energy by playing independently of each other. However, dissonance can vary between different properties of the energy; the instruments can be dissonant by playing in different keys, energy levels, activity of timbre and amplitude. In Fetzen there is global consonance between piano and violin energy, activity and approximate key. Finale contains two sections; one of complete dissonance. The following section of mutual dependence and varying degrees of consonance and activity.
The instruments play solo in movements such as Piano Solo, drum solo, or violin solo. However each solo contains electronic sounds which accompany or create ambience within the movement. Effects such as reverb, distortion, filters, phase shifting, panning, pitch shifting, and convolution are used to create dynamic acoustic space or energy. For example, in the Violin solo, at 1:07 to 1:25, each initial attack of the bow on the strings sounds like glass breaking; the melodic quality of the notes appear after the glass has

broken. Effect processing is a common theme in the piece. For example, in Aqua, the percussive sounds have an actual pitch class quality to them, suggestive of high processing techniques. In the same movement, the percussive sounds revert to sounding less processed at 2:46:90. At this point, the only processing used is reverberation.

PART B

Urgrund-Verweht Energy Analysis

(Spectrogram images in Ugrund-Verweht folder)

Urgrund-Verweht is the 9th movement of Triony's Vector Alpha. The instruments are a piano, percussion, violin, and electronic sounds. This movement is globally dynamic as there are 3 sections with extreme difference in frequency, intensity and activity. The amplitude is continuous and throughout the movement [See Urgrund-Verweht Spect 0.jpg]. In the first section there are low frequencies (0-107Hz) that are locally static and ambient, possibly electronic sound with a LP filter.[See Urgrund-Verweht Spect 1.jpg]. In this same section there are elements of local surprise. For example at 1:04 seconds there is sudden independent burst of energy from the violin which lasts 10 seconds; this sound contains a long release of reverb and a pitch shift effect covering a range of frequencies from 134Hz-19kHz. There is another burst of energy at 1:37 seconds, similar to the first, which indicates the beginning of a new section. The second section is globally static and contains local surprise. [See Urgrund-Verweht Spect 2.jpg]. In this section the piano moves in multiple crescendos of pitch classes, and the other instruments provide elements of local surprise upon entering the acoustic space. These instruments function as a dissonant accompaniment, as they contain elements of opposing activity in varying degrees of independence. The third section begins at 3:47 seconds after a low pass filter cuts off the high frequencies of the previous section. This section contains frequencies that are very bright, clear and high pitched. As well it contains frequencies that are very low pitched, high in reverb diffusion and ambience (0 to 150Hz). This section also contains a steady continuous frequency with distinct partials at 152Hz (-17dB) and 321Hz (-14dB) (as well as lower amplitude partials at 474Hz (around -24dB) and 642Hz (around -29dB) (amplitude of -34Hz)) that end by 6:13 seconds. The frequency at 321Hz is resonated with and continued by a violin which begins at 6:12 seconds (this violin covers a range of 321Hz to 19kHz.) [See Urgrund-Verweht Spect 4A and 4B]. From 6:17 to 6:43 seconds this violin is solo and has low reverb diffusion and a medium release however the decay and sustain of each note is drawn out.

A-Trractor Energy Analysis

(Spectrogram images in A-Trractor folder)

A Trractor is the 3rd movement of Triony's Vector Alpha. This movement is globally static and contains very few discrepancies of local surprise [See A-Trractor 1.jpg]. The piano begins, then at 0:31 seconds a violin is introduced which follows the piano in accompaniment. At 1:25 a second layer of violin fades in and accompanies the first violin sound relatively mimicking its activity and pitch class. This second violin's timbre is brighter and clearer than the first (13608-19078kHz frequency increase from 1:28-2:09) [See A-trractor 2.jpg]. At 1:52 the activity of both violin parts increase in energy intensity. At 2:03 the second violin layer pitch shifts down over 5 seconds until 2:09. The piano

sound increases in activity from 0:00 to 1:37, however after this time the piano begins to accompany the violin by fading into the background ambience with high reverb density and individual tones or notes cannot be differentiated. At 1:52 percussion (drums and cymbal) enter the space, however they have a low pass filter and reverb with high density and diffusion which cause background ambience. These drums emerge from the ambience with bright and clear local surprise at 2:09 seconds which signify the end of the movement [See A-trractor 3.jpg] This movement is globally static as it contains one continuous direction with a general steady increase in amplitude (-19dB to 0dB over the length of the movement with discrepancies at 3.5-5.3 and 10 to 11.5 seconds where it drops to around -35dB.) This amplitude increase signifies the direction from low to high energy thus forming a crescendo [See A-trractor 4.jpg] This crescendo loses intensity and decreases in pitch at 2:11-2:19 however the amplitude is unchanged.

Filigran Energy Analysis

(Spectrogram images in Filigran folder)

Filigran is the 6th movement of Triony's Vector Alpha. Filigran is German for filigree, which means an intricate ornamentation of high frequencies. The name represents the nature of the timbre and tone of sound, as in delicate and high pitched. This movement begins with a chime (bell) sound with percussion then at 34:00 an electronic sound begins with similar activity as the chimes until ending at 1:03. The frequency spectrum is mostly localized to maintain 134Hz-15kHz (which creates a bright and clear timbre.) However at (6-10)(15:41-18:00)(23:00-25:00)(31:00-34:00)(37:00-38:00) seconds the frequency drops below 134Hz to about 26Hz during percussive sounds with high reverb density and diffusion [See Filigran Spect 1.jpg]. Piano, violin, drums (high hats) and electronic sounds are present with equal activity and move with a degree of dependence upon each other (26:00-28:00 examples of all instruments under [delay/gate/pitch shift] this creates a stutter or repeating quality with pitch shift modulating effects) [See Filigran Spect 2.jpg] This movement is globally static as result of these continuous effects from beginning to end. The amplitude of [each] instrument remains mostly consistent (movement begins at -12dB then gradually increases (while fluctuating to -16dB) to -4.66dB by 1:00 then slowly towards 2:04 ramps down to -38dB.) [See Filigran Spect 3.jpg]

Finale Energy Analysis

(Spectrogram images in Finale folder)

The "Finale" movement in Trionys is divided into two sections: from 0:00 to 50:70, the piano, electronic noise and drums are present; from 50:70 to 1:03, the cymbal is heard as a signal that the first section is over. The second section spans from 1:03 to the end of the movement at 1:30:9

In the first section, the intensity level is very high. All instruments are playing against each other and creating dissonance. The piano sounds seem to have been processed, as it sounds like glass being broken at the pace of piano keys being struck. On a harmonic spectrogram, these processed sounds manifest as dotted specs. Each spec seems to represent a piano note. The specs also correspond to how the piano sounds manifest in the second section, when the listener is certain what he or she hears are actually piano notes. If these processed sounds are to be considered piano sounds, then the piano sustains the high energy level throughout the first section, along with the

drums.
The second section, beginning after the cymbal sound ends at 1:03, is distinguishable because it only contains natural piano and violin sounds. Furthermore, a spectrogram of the movement demonstrates a shift in frequency activity between sections: the first section contains high frequency propagation, or vertical movement; the second sections contains visible horizontal movement. The reason for this difference is that the first section contains drum hits and electronic noise that reach very high frequency levels. These sounds mask a lot of the natural piano, which manifest as low frequency, horizontal movement (melodic). Thus, in the second section, the lack of drum hits and electronic noise causes the natural piano and violin to be heard and seen on the spectrogram as horizontal movement, or as individual notes. On a regular spectrogram, a violin sound is visible at 1:03, and plays 522Hz. As the bowstring is slowly drawn over the violin strings, the pitch decreases over the span of 20 seconds, and ends up at 250Hz by 1:23. However, on a melodic range spectrogram, the violin can be seen starting at 57:50 at 888Hz. At this time, the cymbal hit masks the violin sound, and renders it inaudible. Considering the violin note actually begins at 57:50, the violin's rate of frequency change between 57:50 and 1:23 seconds is -18Hz/second. This is derived using the rate of change calculation: (250Hz - 880Hz / 93s - 58s). The spectrogram (2) attached for this movement shows the cymbal noise (orange) as well as the violin.
The loud drum and processed piano sounds dominate the first section. In the second section, however, the violin plays the high pitched note described above, and the pitch gradually drops. The natural piano begins playing notes that range from 220Hz to 263Hz from 0:50 to 1:02 (purple rectangle on spectrogram 3), and ascend in a step like manner to 1076Hz-1308Hz between 1:04 and 1:18 (red rectangle). Whereas the violin gradually decreases in pitch, the piano steps up in pitch. Also, the interaction between instruments changes from the first section: whereas they both were playing intensely before, now it is only the piano that continues to play with this intensity; the violin only sustains one "note" that gradually decreases in pitch. The piano, however, is the dominant instrument of the second section as well as the first. It maintains the high intensity level of the previous section. This sustained intensity and activity level causes the movement to be globally static, except for the silence that ensues at 1:22 (discussed below).
A decrescendo occurs at 1:13:39, where the intensity level and the activity level appear to remain the same, but the volume decreases; the piano plays quickly, as it did throughout the entire movement, and the violin plays individual notes that span over a longer period. The piano maintains the high energy level all throughout the piece. The decrescendo is thus perhaps digitally created by slowly decreasing the volume, even when the players are still playing at high amplitude in realtime. From 1:22 to 1:30:39, there are no sounds present in the acoustic space. Psychoacoustically and without observing an amplitude timeline, the energy level does not seem to decrease as a result of the lack of sound. The on-edge feeling sustained from the very beginning of the piece to 1:22, promulgates that feeling for the rest of the 8 seconds. The listener is not certain whether or not an element of local surprise will manifest, and thus remains weary for the rest of the piece. In observing an amplitude timeline, however, the listener knows that at 1:22, he or she will be put at ease, and no more noise will emerge. This sense of reassurance leads to the movement being viewed as globally dynamic: it begins at high

intensity, and then recedes and completely drops in intensity.