

murmurations

from the simple emerges the beautifully complex



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General Instructions

Applicable to all the pieces in the Series

Background

murmurations is a series of works that deal with self-organization and how complex forms and patterns can emerge from interactions based on very simple rules. Each piece in the series centers one or two specific ideas or sonic parameters (e.g.: pitch, noise, rhythm, a particular articulation, etc).

The instructions set up a simple framework that allows performers to coordinate their actions using three simple rules outlined below. The rules are based on the work of Craig Reynolds in swarm intelligence, modified here so they're more suitable for sonic exploration. They are meant to exert the minimum amount of control possible while still ensuring a certain level of cohesion and autonomy.

Organization

The primary objective in all the pieces is for the ensemble to behave much like a flock of birds, i.e. as a cohesive unit whose cohesion arises only through self-organization at the individual/local level rather than as the result of external order imposed on the entire group. Coordination exists only on the individual level: each individual performer coordinates only with one or two performers immediately adjacent to them (it's not necessary that performers adhere to the same person(s) throughout the entire performance, as long as they only coordinate with someone adjacent to them).

As much as possible, individual performers should avoid intentionally coordinating with the entire ensemble and instead focus on coordinating only with their immediate neighbour(s).

Given an ensemble of at least 3-5 performers (higher numbers could potentially give rise to more exciting outcomes), the performers would move through the piece using three simple rules (additional details and restrictions discussed below). Each performer is only responsible for coordinating with performers immediately adjacent to them, i.e. to their left, right, behind or in front. Coordination must be with at least one other performer at minimum, and up to three or four. The unique dynamic of the group will give rise to unique results that are highly dependant on starting conditions as well as variables encountered along the way (individual decisions made by each performer in real time). The overall (or global) behaviour of the group becomes an emergent property of the simple coordination happening at the local level. Each realization will be unique.

The 3 Rules of Coordination

The three rules are listed in a general way here. They will have more specific applications for each piece in the series.

1. *Avoidance*: Avoid replicating the current conditions of your neighbour(s) exactly.
2. *Alignment*: Match closely but not exactly the movement of your neighbour(s).
3. *Attraction*: Stay close to your neighbour(s) and avoid getting too far from them (generally in all parameters).

murmurations 1

murmurations 1 focuses primarily on pitch. It's for a group of at least 5 performers of any sustaining instrument (more performers would potentially give rise to more complex structures). The performance consists primarily of medium-long to long sustained notes (roughly 5 to 10 seconds, but longer is possible). A performer holds each note-event with minimal change until moving to a new one (see Additional Restrictions below for more details on possible variations in dynamics, articulations, etc).

The 3 Rules of Coordination

1. *Avoidance*: Avoid perfect unisons between you and your neighbour(s). Beatings and imperfect unisons are permissible.
2. *Alignment*: Match closely but not exactly the direction/trajectory (rise and fall in pitch) and speed (rate of pitch change) of movement of your neighbour(s).
3. *Attraction*: Stay close to your neighbour(s) and avoid getting too far from them in all parameters (pitch, dynamics, articulations, etc) especially pitch. Try to stay within a minor 3rd.

Starting a Performance

- Prior to a performance, the group agrees on one central pitch and register (whatever makes sense for the particular make up of the group).
- To start, each performer chooses a pitch at random to play that is around the central pitch chosen by the group (anywhere within a minor third above or below it). Pitches may be outside the equal tempered system. Once the first sound is initiated (by at least one member of the group), the three basic rules outlined above are immediately applicable (for instance, if two neighbors happen to choose the same pitch, one or both must move while adhering to the other two rules as applicable, or if two neighbours choose two pitches that are too far apart, they must start moving towards each other so they're within a minor 3rd, while still adhering to the other rules).
- Performers may coordinate the start, but they don't have to. However, once sound is initiated (by one or more performers), neighbours of those performers should begin not too long after (within 5-10 seconds).
- Once started, the piece unfolds by following the three basic rules. Any decisions not covered by one or more of the three rules, or by the restrictions outlined below are up to the individual performers.

Additional restrictions

- Movement should be generally at a slow pace: each note event is held for 5-10 seconds before moving to the next note event. It's possible to articulate/attack each note event separately or to move between note events via a slow glissando if the instrument permits it.
- Successive note events for each performer should be within a minor 3rd of each other, i.e., the largest jump between two successive events can't exceed a minor 3rd, but maybe smaller. Microtonal movement is possible.
- The choice of successive pitches and the direction of movement are up to individual performers, as long as the three rules are not violated.

- Dynamics should be soft to moderately loud, with occasional variations possible (i.e. if a momentary or local period of loud dynamics arises caused by a loud event initiated by one of the performers, it probably shouldn't last too long because of the global restriction that overall dynamics should be soft to moderately loud).
- Various articulations (other than what is normal/typical/basic for the instrument) are possible on occasion, as long as they're not excessive and don't take over the piece. Performers should self-regulate this (if periods of heavily-articulated events arise, performers should keep in mind what is 'normal' for their instrument and try to return to it).
- Occasional silence is possible, but shouldn't be longer than the duration of a single event (about 5-10 sec). Silences longer than that can be used to signal an individual's desire to end the performance (see below)

Ending a Performance

The piece is the sonic manifestation of the group's exploration of these simple rules of interactions. Since performers aren't working their way to a specific goal, the piece doesn't have an intrinsic end. Any individual performer may choose to end their performance in one of two ways:

1. They can simply stop. A long pause – longer than a single note event – announces that individual's intention to stop.
2. They can hold whatever pitch they're on and stop moving.

In both cases, the decision must originate with the individual and should not be coordinated. The only way this individual decision can take global effect is by following the three rules. In the case of silence, neighbours adjacent to the silent performer must stop within roughly 2-3 note durations (~15 – 30"). The piece will end in a cascade of silence. In the case of an individual holding a note and not moving, neighbours must also come to a final sustained note within about 2-3 note durations (~15 – 30"), while still following the 3 rules. In this case, the piece will end in a sustained cluster. Individuals have the choice to stop when at least one neighbour has reached their sustained note, or to continue holding until more neighbours reach their final notes, or the entire group has done so.