Passing Thru

Variations on a theme by Steve Reich

by Sam Stalos
Chariot Publishing.com
214 403 0005
bnh@bnh.net

Passing Thru for string quartet is an extension of Steve Reich's iconic work, *Clapping Music*. Unlike Reich's composition, *Passing Thru* uses special software and networked computers to control multiple tempi during live performance, thereby creating phasing effects (interference patterns) at different points in the composition. Unlike the structure of Reich's *Clapping Hands*, each section engaged in the phasing process will last for a variety of measures, some lengthy and some relatively short in duration.

During performance, 4 computers are tied to a network and each performer follows their own screen for conducting cues and tempi. A DVD demo of the conducting video created for a similar composition but with different instrumentation can be provided upon request.

An extra computer can be added to the network to generate real-time visualizations for the score. Examples of this visualization technique, which were designed for different compositions, can be seen on the Visualization page of this website.

Logistical Requirements

The networked computers are located on specially designed platforms in front of each performer. This platform contains the computer, the network interface and cabling, the computer monitor and a music stand. Examples of the platforms are seen and discussed on a different page on this website. These special platforms are under constant revision and may be change from time to time, but essentially they will hold the same components. Each performer has their own platform, and the monitors are attached to their platform's column.

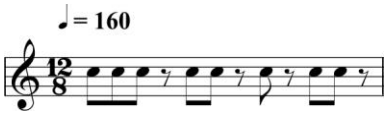
In the most common configuration, the computers are started by one of the performers, which automatically synchronizes and locks all the other computers together. An alternative to this arrangement is to have a fifth master computer added to the network which is located off stage (or to the side) and controlled by a non-performer. This master computer then starts and synchronizes all of the computers assigned to the performers.

The networked computers are hardwired via Ethernet cables to avoid the possibility of wifi interruption. The staging facility needs to supply AC power and music stands for all of the computers and performers. Special platforms used to safely and securely hold the computers and network equipment are provided by the composer. If visualization is

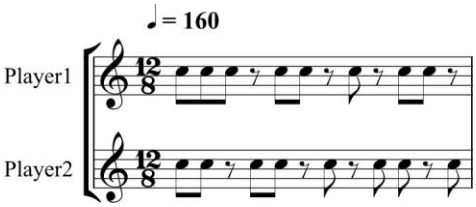
added, a video projector and screen must also be added or provided by the performing venue.

Historical Reference

In 1972 Steve Reich composed a piece for two performers who clap their hands to the rhythmic pattern shown below.



After 12 repetitions, a new pattern is created when one performer shifts the first 8th note (or rest) in the measure to the left. The "excluded" 8th note (or rest) is then moved to the end of the measure, as shown in the example below.



This shifting cycle is repeated 12 times until the pattern played by the second performer is again exactly the same as the original pattern.

Prior to this composition, Reich had been experimenting with phasing, a process that involves moving two identical rhythms slowly apart in tempo until the notes start to overlap by very small increments of time. The sound waves from the two competing sources can create complex rhythmical and acoustical properties known as “phasing.”

> Please Note: There are really two kinds of "phasing" being discussed here. True acoustical phasing is a physical phenomenon caused by the summing and canceling of identical sound waves that are separated by very small differences in time. The time variance can be caused by acoustic reflections in the performance venue or by the distance separating the two sound sources. True acoustical phasing is not common in a theatrical performance venue and requires experimenting with the proximity of the sound sources and the acoustics of the venue itself. True acoustical phasing can also be induced by the sound PA system in the venue, which is especially equipped to control and eliminate that phenomenon.
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> In music, the term "phasing" refers to the creation of complex rhythmic patterns by carefully overlapping the same (or similar) rhythmic patterns via tempo differences. It does not require true acoustical phasing to occur and does not depend on the acoustics of the performance venue. This form of “phasing” is more accurately identified as the creation of “interference patterns.” Even if true acoustical phasing does not occur during a performance, the production of

complex rhythmic patterns caused by the controlled variation in tempo will still take place.

Two Sets of Special Scores

There are two types of scores for this composition: those designed for allowing phasing effects (called **Performance Scores**), and those used just for rehearsal (called **Rehearsal Scores**). The use of the **Rehearsal Scores** do not allow for the production of phasing effects.

To incorporate the phasing techniques designed for this composition, players must use the **Performance Scores**, which, when combined with the video synchronizing equipment, compensate for the shifting of tempi during various sections of the composition. The **Rehearsal Scores** are used only for rehearsal purposes and do not provide for the phasing techniques.

Special Notations in Performance Scores

N.S. ------- This abbreviation identifies those measures in the **Performance Score** that are different from the **Rehearsal Score.** The abbreviation **N.S.** stands for **Note Shift**, a technique used to compensate for the acceleration during the previous passage and to bring that particular instrument back to unison. Passages marked with **N.S**. are not common to all instruments at the same time. Therefore, they appear only in the **Performance Scores** of the instrument(s) affected and not in the **Rehearsal Score**.

T.S. ------ This abbreviation indicates that a particular measure contains extra beats (or sub-beats) to adjust the time lost or gained during the acceleration of a previous passage. In *Passing Thru*, the measures are usually 13/8, but some are also 7/4. Trying to count these odd measures during performance is awkward, and the performer should rely on the conducted video to make these adjustments. Passages marked with **T.S.** appear only in the **Performance Score** and are not common to all instruments at the same time. Therefore, they appear only in the **Performance Scores** of the instrument(s) affected and not in the **Rehearsal Score.**

Accents and Dynamics

Accents and stress points traditionally associated with a time signature are to be avoided. Instead, the beats and patterns are to be as even as possible. This allows the intricate patterns generated by phasing to occur more readily and stops the ear from seeking out the down beat. Therefore, the score contains a minimum of dynamic markings and accents.

That being said, with the introduction of melodic phrases into the score, it is impossible to avoid the identification of certain elements, whether contributed by the performer or the listener. The melodic phrases, no matter how short or how extensively developed, can

provide a contrast, a background layer to the rhythmic structure. At other times, they might be heard as foreground elements, where the competing rhythms are used almost as duets.

The blending of the instruments is critical to the perception of the shifting elements. While each instrument is to be treated as an equal in terms of rhythmic, melodic and harmonic content, a few dynamics are indicated in the score to bring out the elements that oppose or contrast the inevitable rhythmic patterns. After evaluating a number of performances, additional dynamics may be added to the score.

Seating Assignment and Staging

A spreading of the seating assignment indicated below will help to increase the perception of the musical phasing effects. Those instruments which move in opposing tempi during any one section are physically separated from each other as much as possible. This separation also helps the individual players lock onto their unique tempi. There are times when adjacent players will be following opposing tempi, but this situation has been minimized. Whether or not greater separation between the players will enhance the phasing experience depends on the acoustical properties of the venue and cannot be predicted ahead of time.

Seating Assignment

2^{nd} Violin Cello Viola 1^{st} Violin

To achieve true acoustical phasing, the seating arrangement shown here can be altered so that players with opposing tempi are seated as close together as possible. Since true acoustical phasing depends on a lot of other variables and requires some on-site experimentation, true acoustical phasing is not anticipated nor required for this performance.

Composer's Bio: Eastman/University of Rochester grad. Resident of Dallas, Texas.