Assumptions in vanilla Siteswap – paths to new patterns

September 26, 2015

(Src: https://www.juggle.org/assumptions-in-vanilla-siteswap-paths-to-new-patterns/)

Siteswaps, relatively young as they may be within the history of juggling, have taken their permanent place within the juggling community. Originally discovered as a way to describe juggling patterns, it gave way to an entire new world of patterns. This world has proven so extensive that it becomes impossible to "juggle them all."

However, the framework wherein siteswaps "work," is based upon some general assumptions. Only regarding standard or vanilla siteswap, these assumptions are:

1. Both hands throw alternate throws at equally spaced time intervals
2. Both hands throw at the same rhythm
3. One prop can be thrown from one hand at a time, or caught by one hand at a time

The amount of possible patterns this results in is enormous. However, these assumptions only permit us to describe a certain group or type of juggling patterns. Once you let go of these assumptions, several new types and groups of patterns become available. These patterns are mostly theoretical and may not be the most esthetically pleasing, but they can be interesting nonetheless.

Let us take a look at assumption n°1. First off, letting go of this assumption results in the well known group of synchronous patterns, notated in siteswap by using parenthesis (notation developed by Jack Boyce). However, in order to be complete, letting go of the first assumption also includes patterns where throws do not occur at equally spaced time intervals. For example, on rec.juggling, there have been several discussions, debating the possibility of a 4 ball cascade. Richard Kohut proposed at that time to use a "quartersync" throwing pattern, allowing for a 4 ball pattern with alternating crossing throws (whether it is actually a 4 ball cascade is another discussion). You can check it out in his video below:

>> See Original Link

This pattern is a good example of an asynchronous pattern where throws do not occur at equally spaced time intervals. For future reference, let us call these "galloped" patterns. So at this point we have two groups of patterns, being the asynchronous and synchronous. The asynchronous patterns can then be further divided into the galloped and the normal, non-galloped patterns. Standard siteswap is now no longer equipped to describe these patterns, and more complex notations like Multihand Notation or Beatmap will need to be used.

Keeping these different groups in mind, we can look at assumption n°2. Up to this point, all patterns assume that both hands throw at the same rhythm. Leaving this assumption behind, the group of the so-called multi-frequency or polyrhythm patterns is also included. One of the first videos I know of including one of these patterns was Matthew Tiffany's Tiffty 1:

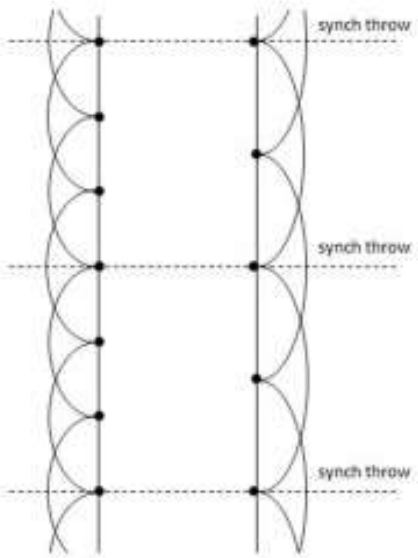
>> See Original Link

This video resulted in a rec.juggling discussion called "Multi-Frequency Juggling".

>> See Original Link

In short, polyrhythms are patterns in which each hand moves at a different rhythm. The rhythm used in the video by Matthew Tiffany is a 3:2 pattern, where in between one synchronous throw, one hand throws two

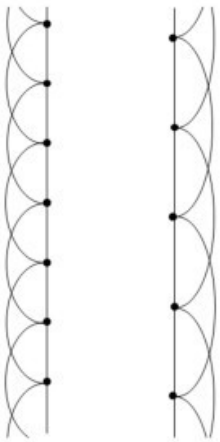
throws and the other only one. An example of this four ball pattern, one where the balls do not cross, is depicted in the ladder diagram below. Here the left hand is throwing faster than the right one (it does 3 beats during the right hand's two).



In the trailer of their new show, 4×4 Ephemeral Architectures, Gandini shows that they include this 3:2 pattern:

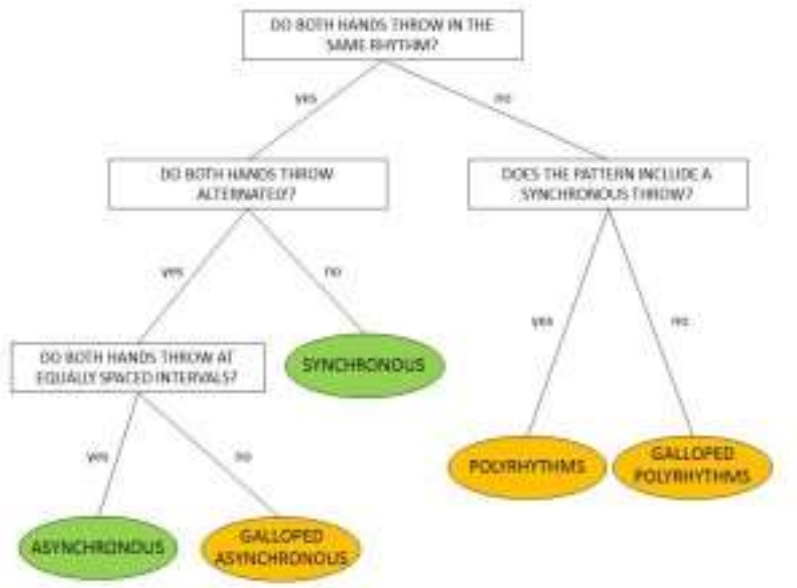
>> See Original Link

Next to 3:2, there are of course other possibilities, being 4:3, 5:3 or even 8:5 or 8:7. The difficulty lies within getting the rhythm right, which is a challenge even without props. Of course these patterns could also be done without the synchronous throws, similar to the galloped patterns discussed before. Looking at the previous ladder diagram, a galloped version of this pattern would look something like this:



Here there are no synch throws, and both hands juggle a different rhythm. For these patterns, time in between throws becomes very small, which makes the difference between patterns very nuanced and mostly theoretical. But a lot of these patterns still need to be discovered and tried out. I'm planning on doing a follow-up article, going more into detail on polyrhythms.

Based on these first two assumptions, we get several groups of patterns that I tried to summarize in the following figure. The group of patterns in green are those that are juggled the most, where the orange ones are those that still need some more research:



And then, the final assumption that only one prop can be thrown from one hand at a time, or caught by one hand at a time. Firstly, letting go of this assumption results in the multiplex patterns (square brackets in siteswaps). But it also includes the so-called squeeze patterns. These patterns were invented by Luke Burrage, when thinking about what a reverse multiplex throw would look like. He had some patterns up on his first site and later on the Siteswap DVD, but recently he made a new video showing some of these patterns (see below). He also has a workshop he gives on the subject, of which some parts can be found online.

>> See Original Link

Squeeze patterns can be described by siteswap notation, including multiplexes. In a normal multiplex siteswap pattern, you do a 2 and then wait for the second ball to arrive. So it is actually a squeeze of a held 2 and another throw. But by changing this 2 to another siteswap value (or doing an active 2), you can create a lot of different patterns. These patterns are often quite challenging, with even two ball patterns that are quite confusing. But once you get your head around them, they become very interesting to do.

And last but not least, you can of course combine squeezes with all the other patterns seen above. So a 4:3 galloped polyrhythm pattern with squeeze catches is probably possible, but has never been done before. This will probably not be the most beautiful juggling pattern, but it would be a unique one. So go out there and explore!

Hans Nickmans

Hans, a Belgian juggler, started out with diabolo in 2003. Shortly after he taught himself how to juggle three balls and never stopped juggling since. He has a strong interest for juggling theory and recently started teaching juggling at a local circus school.