Passing Siteswap Theory

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1 Siteswap Basics

Siteswaps are a mathematical notation for juggling patterns. This chapter will give a short introduction to siteswaps. Throughout the internet, lots of information about two handed siteswaps is available and will therefore not fully be covered within this document.

1.1 Ladder Diagrams

1.2 Vanilla Siteswaps

The simplest form of juggling patterns, consists of one juggler, throwing objects into the air with both hand. The following assumptions can be made.

1. The juggling pattern is juggled by one juggler with two hands

2. The juggler throws objects alternating from the right hand and the left hand

3. The juggler does not throw more than one object at a time

4. The juggler does not catch more than one object at the same time

Patterns like that can be described with Vanilla Siteswaps

Definition 1 (Siteswap) *A siteswap is a series of numbers describing the order objects are thrown in a juggling pattern. Each number n specifies after how many throws an object is thrown again. This means, $n-1$ other throws happen, before the same object is thrown again.*

In a normal cascade, all object are thrown one after another in the same order at the same height. This means, that all numbers in the siteswap are the same. A normal three ball cascade therefore would be a *333*.

A siteswap only describes the order the objects are thrown in. Therefore a three ball cascade, a reverse cascade and a three ball mills mess all have the same siteswap *333*, as the balls are always thrown in the same order.

- Average

-

Definition 2 (Number Of Objects) *The number of objects in a siteswap is the average of the numbers in the siteswap.*

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1.3 Ladder Diagrams

- Ladder Diagram (with time axis) - Siteswap: average,
- Causal Diagram Satz: Local Beat

2 Introduction to Passing Sitewaps

- No informationabout number of hands - 4444 with three hands - Default hand numbering for two person passing patterns - hand numbering implicitely defined - List with standard passing throws Satz: Global Beat Local vs. Global Siteswaps

2.1 Getins/Getouts

2.2 Determine Starting Position

2.3 Period Length

2.3.1 Odd Period Length

2.3.2 Even Period Length

- different pattern for a and b (979722) -> compatible siteswaps - period can be divided by 4 -> unsymmetrical pattern

2.3.3 Compatible Patterns

- Interfaces - Interface backwards - Why not against 6789a

2.3.4 Compatible Feeds

Number of passes in a siteswap

- No compatible 6 club and 7 club patterns

2.4 Asynchronous Patterns with more than two jugglers

- changes: period length, ...

3 Synchronous Siteswaps

- Introduction: first passing patterns synchronous - 4413 -> (4.2x)(2x,4) - order vs. timing - right hands synchronous -> two-count - right hand and left hand synchronous -> 7-club two count - Properties: - period length: always global period - different meaning of same number for A/B Other Beats: - each juggler synchronous -> techno - all hand synchronous -> 8 club singles (two-count)

- more than two juggers - Synchronous Feeds - Global Siteswap of Compatible Feeds

3.1 Introduction to synchronous Siteswaps

- 7566 -> 6.5 5.5 6 6 -> 6pb6p 6 6 - 7566 -> (75)(66) -> (6p6p)(66)

3.2 Odd period length

- period needs to be expanded - jugglers do not do the same pattern

3.3 Even period length

3.4 More than two jugglers

3.4.1 Special Case: Synchronuous Feeds

- 4-count feed or pps-feed

3.4.2 Asyncronous Feeds

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