

Alice in Stretch & SqueezeLand: 17 The “S” Template

August 12, 2012

Chapter Abstract

Alice in
Stretch &
SqueezeLand:
17 The “S”
Template

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Summary-01

Used-Martin-
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06

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07

Used-Martin-

For attractors with “a hole in the middle” the branched manifold had been (until 2010) a *gateau roulé*.

Does Nature produce other templates? (Yes)

Does a simple perestroika relate a *gateau roulé* with an S-template?

Basic Stretch - Fold - Roll Template

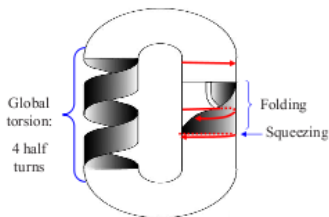


FIG. 1. (Color online) Typical scheme of a template.

Javier Used and Juan Carlos Martin,
Multiple topological structures of chaotic attractors ruling the
emission of a driven laser,
Phys. Rev. E **82**, 016218 (2010).

Three Branch Template

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The “S” Folding Mechanism

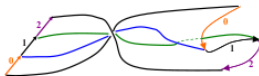


FIG. 2. (Color online) Scheme of a template with three branches and an *S* folding process.

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

Used-Martin-
06

Used-Martin-
07

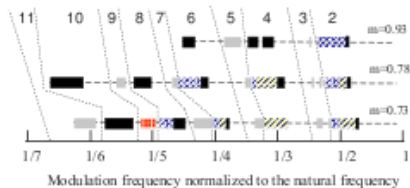
Used-Martin-

2 Branches & 3 Branches

TABLE I. (Color online) Folding processes characteristic of the different species of templates treated in this work.

Species	Horseshoe	Reverse horseshoe	Out-to-in spiral	In-to-out spiral	Staple	S
Code in Fig. 1				Not found here		
Insertion matrix	(0 1)	(1 0)	(0 2 1)	(1 2 0)	(0 2 1) or (1 2 0)	(2 1 0)
Sketch of the folding process						

Spectrum of Behaviors in Resonance Regions



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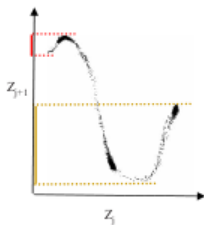
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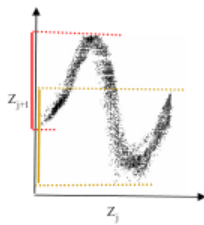
Used-Martin-

Constraints:

No

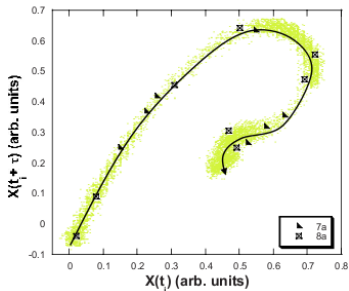
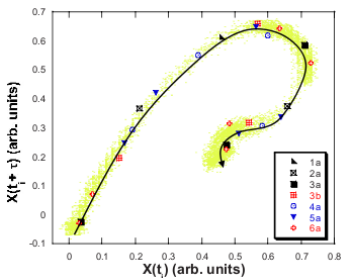


Yes



Poincaré Sections

Poincaré Sections & Periodic Orbits



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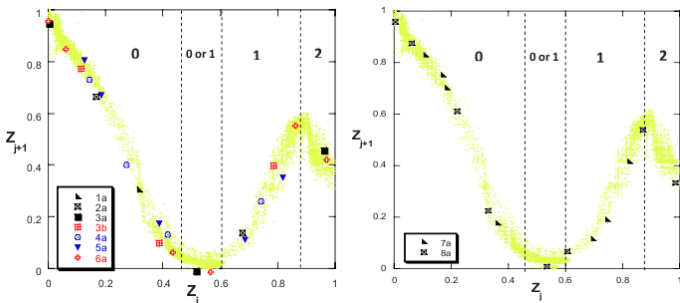
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Return Maps on Poincaré Sections

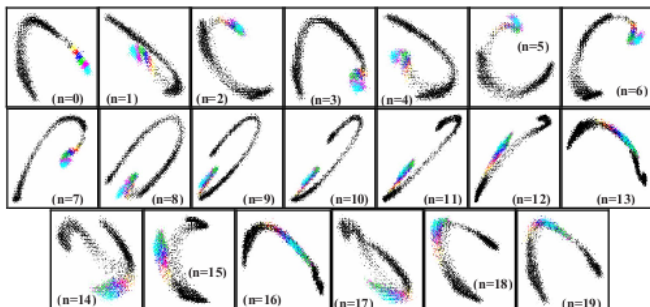
“Generating” Partition



Symbol Sets - Periodic Orbits

Attractor Intersections

20 Equally-Spaced Planes



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Table of Linking Numbers

Linking Numbers for Certain Orbits

TABLE II. Linking numbers between the UPOs extracted from the time series corresponding to pump modulation frequency $f = 4.25$ KHz and modulation index $m=0.73$.

	$\bar{0}$	$\bar{10}$	3a	$\overline{100}$	$\overline{1000}$	$\overline{10010}$	6a	$\overline{1001010}$	8a
$\bar{0}$	0								
$\bar{10}$	9	9							
3a	14	28	28						
$\overline{100}$	14	28	42	28					
$\overline{1000}$	18	37	56	56	55				
$\overline{10010}$	23	*	70	*	92	92			
6a	28	56	*	*	112	*	139		
$\overline{1001010}$	32	*	98	*	129	*	*	194	
8a	37	74	111	111	148	*	*	*	259