Holy City Audio Forum

Former Home of SpinCAD Designer

Creating 'different' LFO waveforms

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Creating 'different' LFO waveforms (#p3516)

by **Zandercircuitry** » Mon Jul 01, 2019 5:13 am

I'm really interested in using different waveforms for modulation circuits,

I've been getting some OK results using the 'clip' block to chop the ends off of a sine wave, and it sounds ok.

I was just wondering if I'm missing a trick, are there easier/better ways to create some weird and wonderful waveforms to hook up to an LFO?

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Re: Creating 'different' LFO waveforms (#p3517)

by **lutop** » Tue Jul 02, 2019 11:54 pm

You can get some ideas from this code. It's taken from a multi-tremolo with different waveforms (I can't credit the original author as I don't remember where I got it from...)
It uses both sine and ramp LFOs to create different shapes. I think most of them can be implemented easily in SpinCAD as it mainly uses ABSA and SOF (both available in SpinCAD). Feel free to ask ff you need help understanding how the different transformations happen.

```
cho   rdal,sin0
sof 1,0.5
wrax sine,0 ;sine wave

cho rdal,sin1
absa
sof -2,0.999
sof 1,0.001
wrax hypsin,1 ;Hyper triangle sort of

sof -1,0.999
sof 1,0.001
wrax hump,0 ;rectified sine humps

cho rdal,rmp0
sof -2,0.999
sof 1,0.001
wrax rampdown,1 ;downwards ramp

sof -1,0.999
sof 1,0.001
wrax rampup,1 ;upwards ramp

sof 1,-0.5
absa
sof -2,0.999
sof 1,0.001
wrax tri,1 ;triangle
```

```
sof 1,-0.5
sof -2,0
sof -2,0
sof 0.5,0.5
wrax trap,1 ;trapezoid

sof 1,-0.5
sof -2,0
sof -2,0
sof -2,0
sof -2,0
sof -2,0
sof 0.5,0.5
wrax square,0 ;square sort of might need more sofs to straighten the sides up more
```

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Re: Creating 'different' LFO waveforms (#p3519)

by **Digital Larry** » Wed Jul 03, 2019 10:48 am

About the only concept I have of this is to use the raw materials of SIN, RAMP, or TRIANGLE. Square can be created from SIN using the "Clip' control. PWM can be done with a triangle wave and the Clip control.

Stepped waveforms can be accomplished with the S/H block. Random S/H can be created from the AMZ Noise waveform.

Scaling and curves can be done with scale/offset (natch) and the power block processing a raw waveform. The smoothing block will take the sharp edges off anything.

Log and exp could give something similar to the Power block, but I haven't wrapped my head around these instructions recently to know of any pitfalls.

What else did you have in mind?

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Re: Creating 'different' LFO waveforms (#p3522)

by **Zandercircuitry** » Thu Jul 11, 2019 1:00 am

> ***Digital Larry wrote:***
> About the only concept I have of this is to use the raw materials of SIN, RAMP, or TRIANGLE. Square can be created from SIN using the "Clip' control. PWM can be done with a triangle wave and the Clip control.
>
> Stepped waveforms can be accomplished with the S/H block. Random S/H can be created from the AMZ Noise waveform.
>
> Scaling and curves can be done with scale/offset (natch) and the power block processing a raw waveform. The smoothing block will take the sharp edges off anything.
>
> Log and exp could give something similar to the Power block, but I haven't wrapped my head around these instructions recently to know of any pitfalls.
>
> What else did you have in mind?

OOH yeah that gives me some good variation, I'll have a mess about with that...I don't doubt I'll be positing screenshots soon asking why I can't figure it out...but lets see how I get on 😁😁

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Re: Creating 'different' LFO waveforms (#p3523)

by **Zandercircuitry** » Thu Jul 11, 2019 1:16 am

On a slight tangent from this, would there be any reason that when using a delay block with the Sin LFO block to create a chorus effect (the aim being to create patches with a chorus using different waveforms), there seems to be what I can only describe as 'clipping' / static noise on on the peaks of the waveform?

& is there a way to stop the 'click' when using the sample/hold block? Just tried this with a phaser and it sounds awesome apart from the audible click between each sample

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Re: Creating 'different' LFO waveforms (#p3524)

by **Zandercircuitry** » Thu Jul 11, 2019 2:47 am

> ***lutop wrote:***
> You can get some ideas from this code. It's taken from a multi-tremolo with different waveforms (I can't credit the original author as I don't remember where I got it from...)
> It uses both sine and ramp LFOs to create different shapes. I think most of them can be implemented easily in SpinCAD as it mainly uses ABSA and SOF (both available in SpinCAD). Feel free to ask ff you need help understanding how the different transformations happen.
>
> ```
> cho   rdal,sin0
> sof 1,0.5
> wrax sine,0 ;sine wave
>
> cho rdal,sin1
> absa
> sof -2,0.999
> sof 1,0.001
> wrax hypsin,1 ;Hyper triangle sort of
>
> sof -1,0.999
> sof 1,0.001
> wrax hump,0 ;rectified sine humps
>
> cho rdal,rmp0
> sof -2,0.999
> sof 1,0.001
> wrax rampdown,1 ;downwards ramp
>
> sof -1,0.999
> sof 1,0.001
> wrax rampup,1 ;upwards ramp
>
> sof 1,-0.5
> absa
> sof -2,0.999
> sof 1,0.001
> wrax tri,1 ;triangle
>
> sof 1,-0.5
> sof -2,0
> sof -2,0
> sof 0.5,0.5
> wrax trap,1 ;trapezoid
>
> sof 1,-0.5
> sof -2,0
> sof -2,0
> sof -2,0
> sof -2,0
> ```

```
sof -2,0
sof 0.5,0.5
wrax square,0 ;square sort of might need more sofs to straighten the sides up more
```

Unfortunately I don't understand spinasm at all, I'd love to be able to work with these kinds of waveforms and attach them to various modulation effects, no idea how I'd go about doing that through spin cad though

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Re: Creating 'different' LFO waveforms (#p3525)

by **Digital Larry** » Thu Jul 11, 2019 8:56 am

> ***Zandercircuitry wrote:***
> On a slight tangent from this, would there be any reason that when using a delay block with the Sin LFO block to create a chorus effect (the aim being to create patches with a chorus using different waveforms), there seems to be what I can only describe as 'clipping' / static noise on on the peaks of the waveform?

The "Delay" block does not use interpolated delay for changing delay times smoothly. Use the "Servo Delay" block for that instead.

> ***Zandercircuitry wrote:***
> & is there a way to stop the 'click' when using the sample/hold block? Just tried this with a phaser and it sounds awesome apart from the audible click between each sample

How exactly are you using the S/H block?

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Re: Creating 'different' LFO waveforms (#p3527)

by **Digital Larry** » Fri Jul 12, 2019 3:27 am

The Absolute Value is also a component of some waveforms. In fact, the only basic waveforms generated by the FV-1 are Sin/COS and Ramp. Triangle is created from Ramp using the absolute value function. ABSA could also be used with Sin waveforms to make some interesting stuff. One of the biggest challenges I've found with some types of modulation, especially with a phaser, is avoiding the eeeeeeeeee-YOOSH-eeeeeeeee-YOOSH sweeping effect where it all seems bunched up at one end.

Also note that SOF can be used to clip signals (at +/- 1.0) to give them flat tops. I've used this with both Sin and Triangle type waveforms.

Most modulation inputs are intended for 0 to 1 range or a subset thereof. So if your raw waveform is +/- 1.0 you are almost always going to need to SOF (scale/offset) it to the desired range.

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Re: Creating 'different' LFO waveforms (#p3533)

by **Zandercircuitry** » Wed Jul 17, 2019 3:43 am

I'll come back to this in detail when I get a chance to sit down and attempt it again, I'll send some screenshots, I'm aware its highly likely something I'm hooking up completely bass-ackwards.

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Re: Creating 'different' LFO waveforms (#p3534)

by **Zandercircuitry** » Wed Jul 17, 2019 3:45 am

> ***Digital Larry wrote:***
>
> The "Delay" block does not use interpolated delay for changing delay times smoothly. Use the "Servo Delay" block for that instead.

Servo Delay?? I see the Servo Flanger block but not the delay...

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Re: Creating 'different' LFO waveforms (#p3535)

by **Digital Larry** » Wed Jul 17, 2019 7:46 pm

> ***Zandercircuitry wrote:***
>
> > ***Digital Larry wrote:***
> >
> > The "Delay" block does not use interpolated delay for changing delay times smoothly. Use the "Servo Delay" block for that instead.
>
> Servo Delay?? I see the Servo Flanger block but not the delay...

Yeah... cough... that's what I meant...

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Re: Creating 'different' LFO waveforms (#p3538)

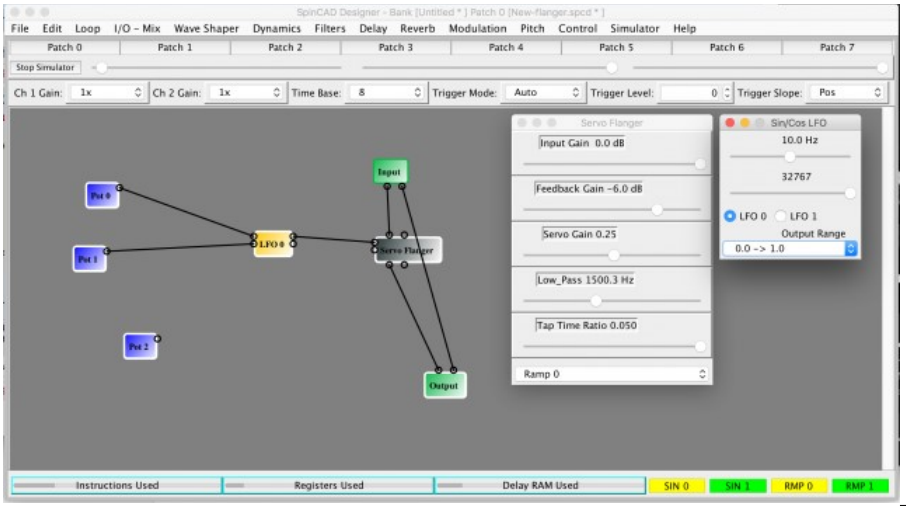
by **Zandercircuitry** » Fri Jul 19, 2019 7:23 am

> ***Digital Larry wrote:***
>
> > ***Zandercircuitry wrote:***
> >
> > > ***Digital Larry wrote:***
> > >
> > > The "Delay" block does not use interpolated delay for changing delay times smoothly. Use the "Servo Delay" block for that instead.
> >
> > Servo Delay?? I see the Servo Flanger block but not the delay...
>
> Yeah... cough... that's what I meant...

I did think it may have been,

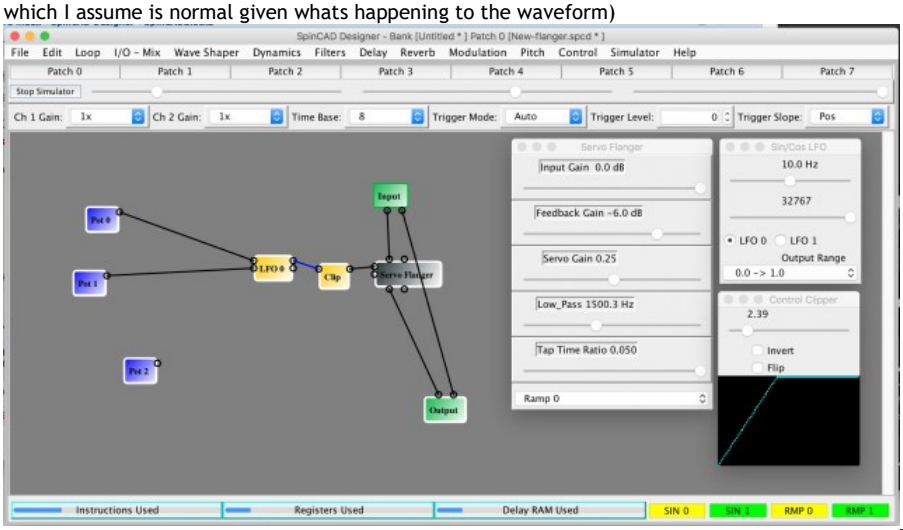
Ok so I had a chance to go over what I was doing again...

Hooking the servo flanger up to the regular sin/cos LFO block like so worked just fine, nice chorus/vibrato...



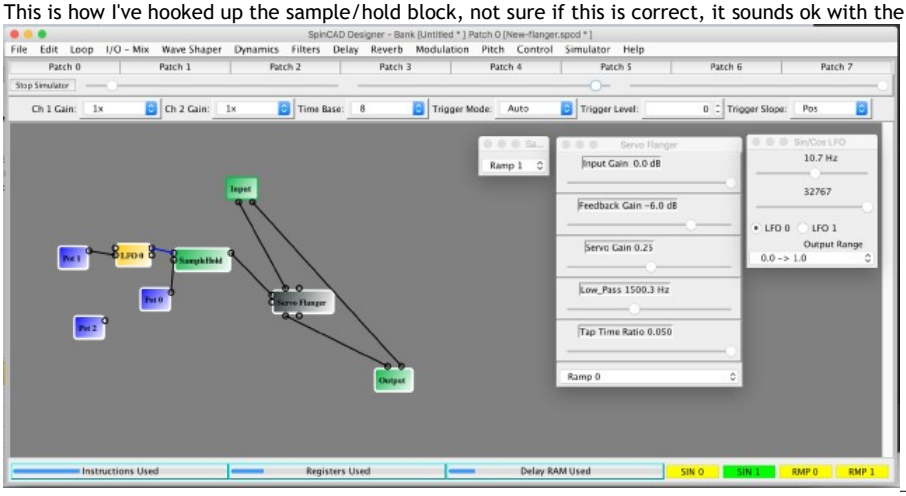
(https://ibb.co/SNBRCtw)

Adding in the clip block to that also works fine, although the more 'extreme' the clip, the quicker the depth control stops working (it just cuts off, which I assume is normal given whats happening to the waveform)



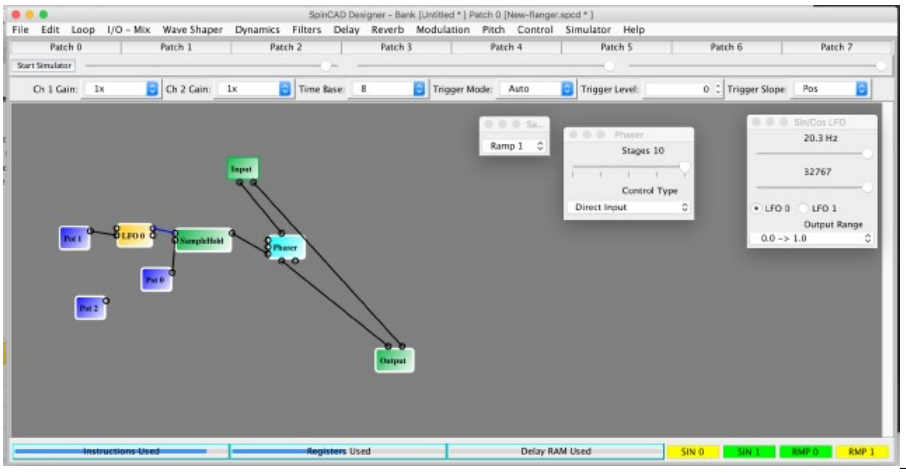
(https://ibb.co/DVCfWRV)

This is how I've hooked up the sample/hold block, not sure if this is correct, it sounds ok with the flanger...



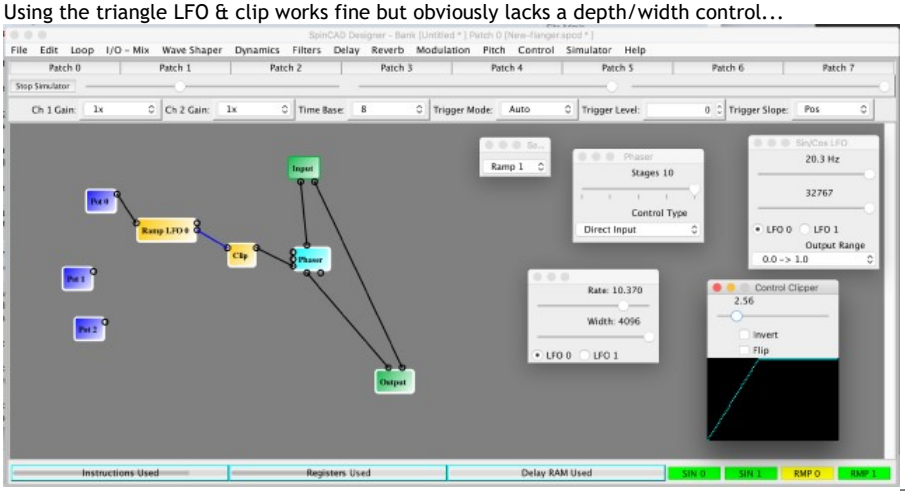
(https://ibb.co/kXggPwb)

But swapping that out for the phaser is where the weird clicking begins...



(https://ibb.co/S6ZZbj0)

Using the triangle LFO & clip works fine but obviously lacks a depth/width control...



(https://ibb.co/rvY0GKQ)

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Re: Creating 'different' LFO waveforms (#p3539)

by **Digital Larry** » Fri Jul 19, 2019 7:40 am

Thanks for all your effort.

"Clipper" is just a programmable gain block that slams the signal into the "rails". I was probably thinking of the "Slicer" which puts out 0 to 1 with a variable threshold on the input signal. THAT will do PWM with a triangle wave. Sorry about the confusion, I don't use SpinCAD much these days.

Put a "Smoother" between the S/H output and the phaser phase control input. Without that the signal definitely jumps around suddenly and can easily give rise to clicks and glitches.

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Re: Creating 'different' LFO waveforms (#p3540)

by **Zandercircuitry** » Mon Jul 22, 2019 5:56 am

> ***Digital Larry wrote:***
> Thanks for all your effort.
>
> "Clipper" is just a programmable gain block that slams the signal into the "rails". I was probably thinking of the "Slicer" which puts out 0 to 1 with a variable threshold on the input signal. THAT will do PWM with a triangle wave. Sorry about the confusion, I don't use SpinCAD much these days.

> Put a "Smoother" between the S/H output and the phaser phase control input. Without that the signal definitely jumps around suddenly and can easily give rise to clicks and glitches.

Awesome, I'll give those a go thanks!

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