IIR Filter IP

2017.04.20

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Overview

- System Design

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- IIR IP

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- Zynq Communication

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- System Design
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- Zynq Communication
- Example Outputs

System Design

Picture of the entire system, zoom in to see/explain things.

IIR IP

This frame will contain a picture of the IP. Discuss the I/O pins.

IIR IP — Data Input Process

These frames will contain code snippets from the IP. Namely the important parts such as data (feedforward)/feedback input, arithmetic, data output, and the elaborated design.

IIR IP — Arithmetic

Arithmetic

IIR IP — Data Output

Data Output

IIR IP — Elaborated Design

Big Picture, will need to zoom in.

IIR IP — IIR Troubles

- Single Stage vs BiQuad

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- Single Stage vs BiQuad
- Floating Point to Fixed Point

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- Single Stage vs BiQuad
- Floating Point to Fixed Point
- Gains and Scaling

IIR IP — Single Stage Problems

This will probably have 2 pictures and some bullets: one of a completely fine set of coefficients and another with a bad set on one side and on the other side there will be a list of things that are wrong.

- Number of coefficients increases dramatically

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- Numerator coefficients approach zero

IIR IP — Single Stage Problems

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- Number of coefficients increases dramatically
- Numerator coefficients approach zero
- Denominator coefficients approach infinity

IIR IP — BiQuad

This will have a picture of the coefficients generated for a BiQuad to one side. The other side will have some bulleted information.
Pros:

- Number of coefficients never change

Cons:

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Cons:

- Numerator coefficients need scaled
- Requires more hardware

IIR IP — Fixed Point

A discussion on why the coefficients need to be scaled. Probably will just contain pictures.

IIR IP — Scaling

A discussion on how to scale coefficients in MATLAB and the remaining issues with scaling.

Zynq Communication — Outside the IP

Picture of the GPIOs that connect with the IPs, probably won't be using the mux/dmux design for this, so I'll be super basic. I might remove this entire section because it is so basic.

Zynq Communication — Inside the IP

Snippet of the coefficient input process

Example Outputs — Lowpass

Picture of a lowpass filter, and the properties listed somewhere on here.

Example Outputs — Highpass

Picture of a highpass filter, and the properties listed somewhere on here.

Example Outputs — Something Else

Picture of a something else filter, and the properties listed somewhere on here.