Andy Kirby and Cameron Blegen

Homework 4

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33    %% %% %% %% %% %% %% %% %% %% FUNCTIONS %% %% %% %% %% %% %% %% %% %% %% %% %%
34
35    % Compares the contents of each file, displaying the results
36    function compareResults(input, matlab, vhdl, W, F, Fm, verbose)
37        in_id = fopen(input); input = textscan(in_id,'%s'); input = input{1}; fclose(in_id);
38        v_id = fopen(vhdl); vhdl = textscan(v_id,'%s'); vhdl = vhdl{1}; fclose(v_id);
39        m_id = fopen(matlab); matlab = textscan(m_id,'%s'); matlab = matlab{1}; fclose(m_id);
40
41        num_misses = 0;
42        for i = 1:length(input)
43            % Convert file values to doubles for easy displaying
44            in = fi([], 0, W, F, Fm); v = fi([], 0, W, F, Fm); m = fi([], 0, W, F, Fm);
45            in.bin = input{i}; v.bin = vhdl{i}; m.bin = matlab{i};
```

```
Command Window
MATCH (TEST 19989): INPUT: 1111111111010111--255.8398       VHDL: 0001100110001111--25.5586       MATLAB: 0001100110001111--25.5586
MATCH (TEST 19990): INPUT: 1111111111011010--255.8516       VHDL: 1101000010100011--208.6367       MATLAB: 1101000010100011--208.6367
MATCH (TEST 19991): INPUT: 1111111111011110--255.8672       VHDL: 0010010000110010--36.1953       MATLAB: 0010010000110010--36.1953
MATCH (TEST 19992): INPUT: 1111111111100001--255.8789       VHDL: 1010011101101101--167.4258       MATLAB: 1010011101101101--167.4258
MATCH (TEST 19993): INPUT: 1111111111100100--255.8906       VHDL: 0110110111000100--109.7656       MATLAB: 0110110111000100--109.7656
MATCH (TEST 19994): INPUT: 1111111111101000--255.9063       VHDL: 0010000101000100--33.2656       MATLAB: 0010000101000100--33.2656
MATCH (TEST 19995): INPUT: 1111111111101011--255.918       VHDL: 0101111011011100--94.8594       MATLAB: 0101111011011100--94.8594
MATCH (TEST 19996): INPUT: 1111111111101110--255.9297       VHDL: 1110111000101010--238.1641       MATLAB: 1110111000101010--238.1641
MATCH (TEST 19997): INPUT: 1111111111110001--255.9414       VHDL: 1010111000001001--174.0352       MATLAB: 1010111000001001--174.0352
MATCH (TEST 19998): INPUT: 1111111111110101--255.957       VHDL: 0111101110111111--123.7461       MATLAB: 0111101110111111--123.7461
MATCH (TEST 19999): INPUT: 1111111111111000--255.9688       VHDL: 0001010111010010--21.8203       MATLAB: 0001010111010010--21.8203
Comparison finished. Total matches: 19999 Total misses: 0
fx >>
```

We tested many inputs to 3 cascaded Newton iterations in ModelSim, verifying the results using the fixed-point toolbox. We set the initial guess to 0.5, the number width to 16 bits, and the fractional width to 8 bits. All results matched.