**Serpentine Channel**

***Basic Component description***

Channel that doubles back on itself, composed of alternating long straight sections and shorter straight sections (intersects are 90 deg angles).

***Component Specs***

Used for mixing (change in flow profile on curved sections) and increased resistance (or length) within confined device footprints

***List Input and Output nodes***

Chart, box and whisker chart

Description automatically generated

Figure 1: Example mixer diagram

in({P} [type] fluid input, {V} [type] chemical input)

out({P} [type] fluid output, {V} [type] chemical output)

***Microfluidic Operations***

Mixing, transport, delay line, variable resistence

***Component Verilog-AMS parameters***

Channel cross section (w | width, h | height)

Serpentine footprint (L | footprint length, W | footprint width, n | number of bends)

**ASSUMPTIONS:**

Longer channel segments flow along the footprint length (L)

Longer channel segments are evenly spaced out

The number of channels is equal to the number of bends

In/out ports are at opposite corners of the footprint, one port will be at a long channel, one port will be at a short channel

***Virtuoso Description***

**OpenSCAD Description**

Information such as API and other important information that is useful for the user or an engineer trying to implement the module

***Manufacturing Description***

This section will contain information of the process that is need to create the component. This will include information on the exposure profile, and how this changes throughout the part, and special post processing steps that need to be done.

***Component model***

This will be the complete mathematical description of the geometric parameters with the flow properties, and any derivations needed.

Equations for resistance/flow rate are derived from straight channel component models, length is calculated as below.

***References***

[1] H. Bruus. “Chapter 1: Governing Equations in Microfluidics.” *Microscale Acoustofluidics*, 2014, pp. 1-28. <https://pubs.rsc.org/en/content/chapterhtm/2014/bk9781849736718-00001?isbn=978-1-84973-671-8>