

# Lab 3: Web Application with Genie

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## I. INTRODUCTION

In this project, we employed the Genie Framework in Julia. Genie stands as a full-stack MVC web framework renowned for its streamlined and efficient workflow, tailored for crafting modern web applications. Leveraging Julia's inherent strengths—including its high-level nature, exceptional performance, dynamic capabilities, and JIT compilation—Genie exposes a rich API and a robust toolset, empowering developers for productive web development endeavors. [1]

## II. EXERCICES

- enhancing the behavior of the sine wave graph by incorporating a new feature: Phase adjustment. This modification allows users to manipulate the phase of the sine wave within a range of  $-\pi$  to  $\pi$ , with increments or decrements occurring in steps of  $\pi/100$ . This added functionality provides users with greater control and versatility when analyzing and visualizing sine wave patterns.

```
1 using GenieFramework
2 @genietools
3
4 @app begin
5
6     @in N::Int32 = 1000
7     @in amp::Float32 = 0.25
8     @in freq::Int32 = 1
9     @in ph::Float64 = 3.14/100
10    @in offset::Int32 = 0
11
12
13    @out my_sine = PlotData()
14
15    @onchange N, amp, freq, ph, offset begin
16        x = range(0, 1, length=N)
17        y = amp*sin.(2*pi*freq*x.+ph).+offset
18
19        my_sine = PlotData(x=x,
20                          y=y,
21                          plot=StipplePlotly.Charts.PLOT_TYPE_LINE)
22    end
23 end
24
25
26 @page("/", "app.jl.html")
```

Figure 1: Adding the phase function

```
<div class="st-col col-12 col-sm st-module">
  <p><b>phase</b></p>
  <q-slider v-model="ph"
    :min="-3.14" :max="3.14"
    :step="3.14/100" :label="true">
</q-slider>
</div>
<div class="st-col col-12 col-sm st-module">
  <p><b>offset</b></p>
  <q-slider v-model="offset"
    :min="0" :max="5"
    :step="0.5" :label="true">
</q-slider>
</div>
```

Figure 2: Adding the phase function in HTML(VSCODE)

```
1 using GenieFramework
2 @genietools
3
4 @app begin
5
6     @in N::Int32 = 1000
7     @in amp::Float32 = 0.25
8     @in freq::Int32 = 1
9     @in ph::Float64 = 3.14/100
10
11
12    @out my_sine = PlotData()
13
14    @onchange N, amp, freq, ph begin
15        x = range(0, 1, length=N)
16        y = amp*sin.(2*pi*freq*x.+ph)
17
18        my_sine = PlotData(x=x,
19                          y=y,
20                          plot=StipplePlotly.Charts.PLOT_TYPE_LINE)
21    end
22 end
23
24
25 @page("/", "app.jl.html")
```

Figure 3: Adding the offset function in Julia

```
app.jl | app.jl.html |
1 <header class="st-header q-pa-sm">
2   <h1 class="st-header__title text-h3" Sinewave Dashboard </h1>
3 </header>
4
5 <div class="row">
6   <div class="st-col col-12 col-sm st-module">
7     <p><b># Samples</b></p>
8     <q-slider v-model="N"
9       :min="10" :max="1000"
10      :step="10" :label="true">
11   </q-slider>
12   </div>
13
14   <div class="st-col col-12 col-sm st-module">
15     <p><b>Amplitude</b></p>
16     <q-slider v-model="amp"
17       :min="0" :max="3"
18       :step=".5" :label="true">
19   </q-slider>
20   </div>
21
22   <div class="st-col col-12 col-sm st-module">
23     <p><b>phase</b></p>
24     <q-slider v-model="ph"
25       :min="-3.14" :max="3.14"
26       :step="3.14/100" :label="true">
27   </q-slider>
28   </div>
29 </div>
```

Figure 4: Adding the offset function in HTML



Figure 5: Julia REPL

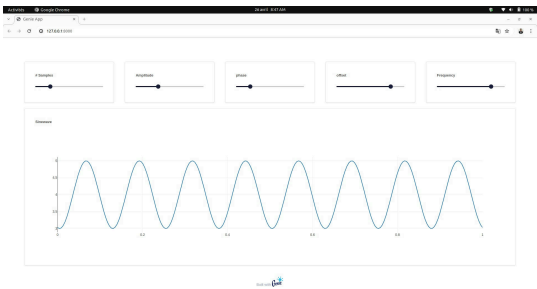


Figure 6: Sine Wave

III. CONCLUSION

-In this Lab, we had the privilege of leveraging the Genie Lab in Julia, empowering us to craft a mathematical web application with ease. Genie Lab, built on the robust Genie framework, provides a comprehensive platform tailored for mathematical applications. With its intuitive interface and powerful backend, Genie Lab enables seamless design and deployment of web-based mathematical tools and simulations. This combination of Julia’s computational prowess and Genie’s web development capabilities offers a compelling solution for creating dynamic and interactive mathematical applications on the web.

REFERENCES

[1] R. Astley and L. Morris, “At-scale impact of the Net Wok: A culinarily holistic investigation of distributed dumplings,” *Armenian Journal of Proceedings*, vol. 61, pp. 192–219, 2020.