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[13]: using Markdown
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```
[14]: using Plots, LaTeXStrings
```

1 Chapter 1 Figures for rates

```
[15]: begin
      mma(x) = 1/(1+x)
      mmr(x) = 1/(1+1/x)
      hfr(n) = x -> 1/(1 + x^n)
      hfa(n) = x -> 1/(1 + (1/x)^n)
      hs( , n) = x-> hfr(n)(x) + * hfa(n)(x)
    end
```

```
[15]: hs (generic function with 1 method)
```

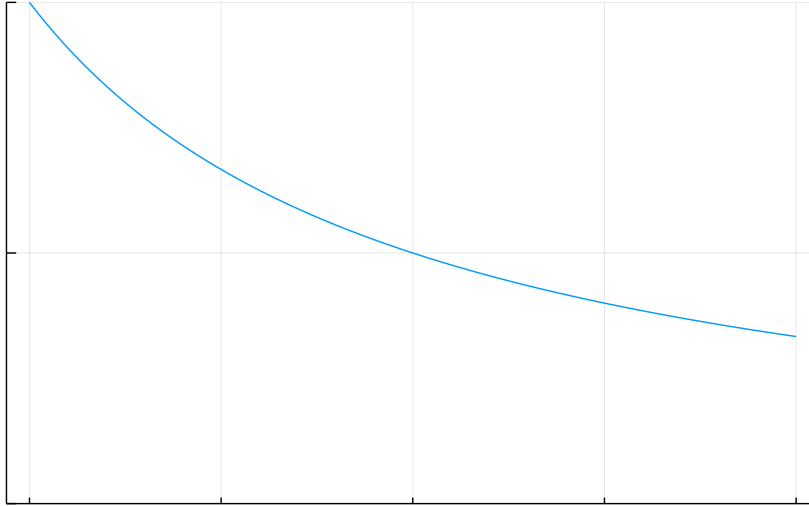
```
[16]: x = 0:0.01:2.0
```

```
[16]: 0.0:0.01:2.0
```

```
[17]: m2 = plot(mma, x, legend=:none, ylims = (0. ,1.),
      ↪xformatter=_->"", yformatter=_->"",
      ↪title="Michaelis-Menten Repressor", yticks=[0, 0.5, 1.0])
```

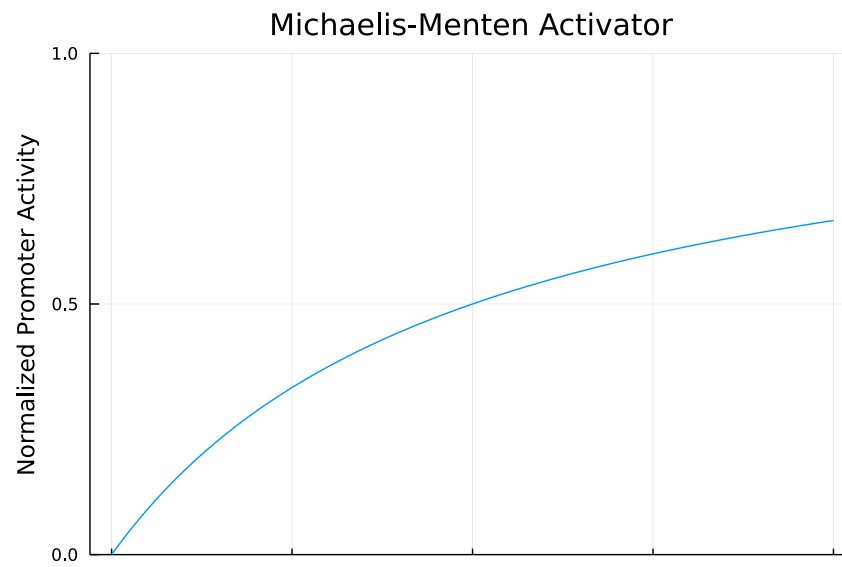
```
[17]:
```

Michaelis-Menten Repressor



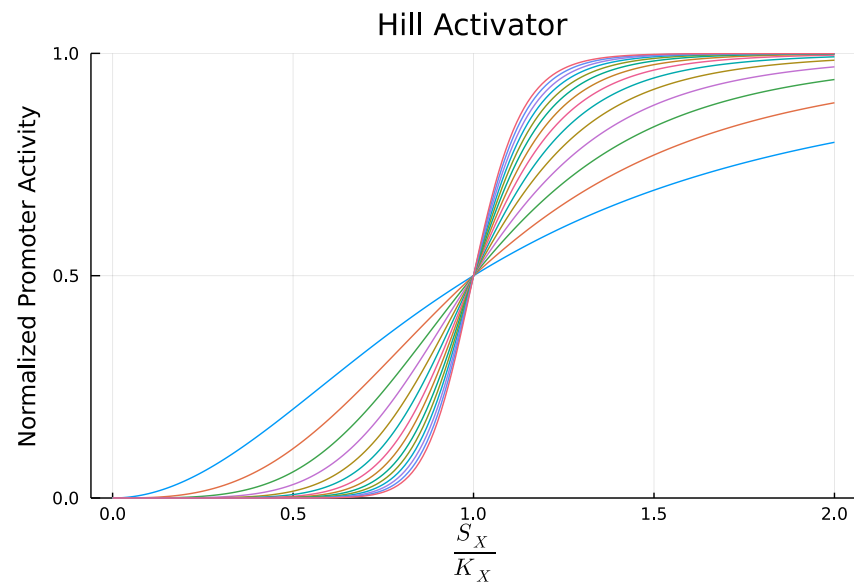
```
[18]: m1 = plot(mmr, x, legend=:none, ylimits = (0. ,1.),  
              xformatter=_->"",  
              title="Michaelis-Menten Activator",  
              ↪ylabel="Normalized Promoter Activity", yticks=[0, 0.5, 1.  
              ↪0])
```

[18]:



```
[19]: begin
      plot()
      for n = 2:15
          plot!(hfa(n), x, label=L"n = %$n")
      end
      m3 = plot!(legend=:none, xlabel=L"\frac{S_X}{K_X}",
      ↪ylimits = (0.,1.), title="Hill Activator",
      ↪ylabel="Normalized Promoter Activity", yticks=[0, 0.5, 1.
      ↪0])
      end
```

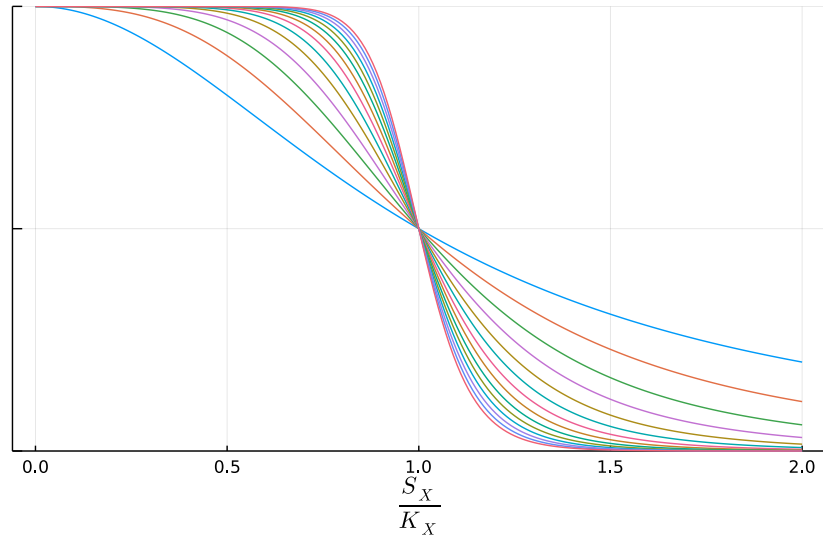
[19]:



```
[20]: begin
      plot()
      for n = 2:15
        plot!(hfr(n), x)
      end
      m4 = plot!(legend=:none, xlabel=L"\frac{S_X}{K_X}",
      ↪ylimits = (0.,1.),
        yformatter=_->"",
        title="Hill Repressor", yticks=[0, 0.5, 1.0])
    end
```

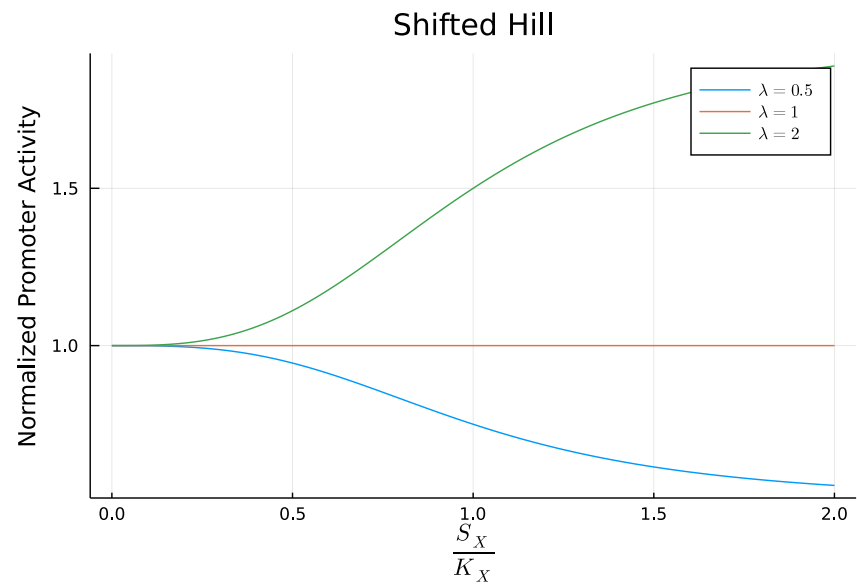
[20]:

Hill Repressor



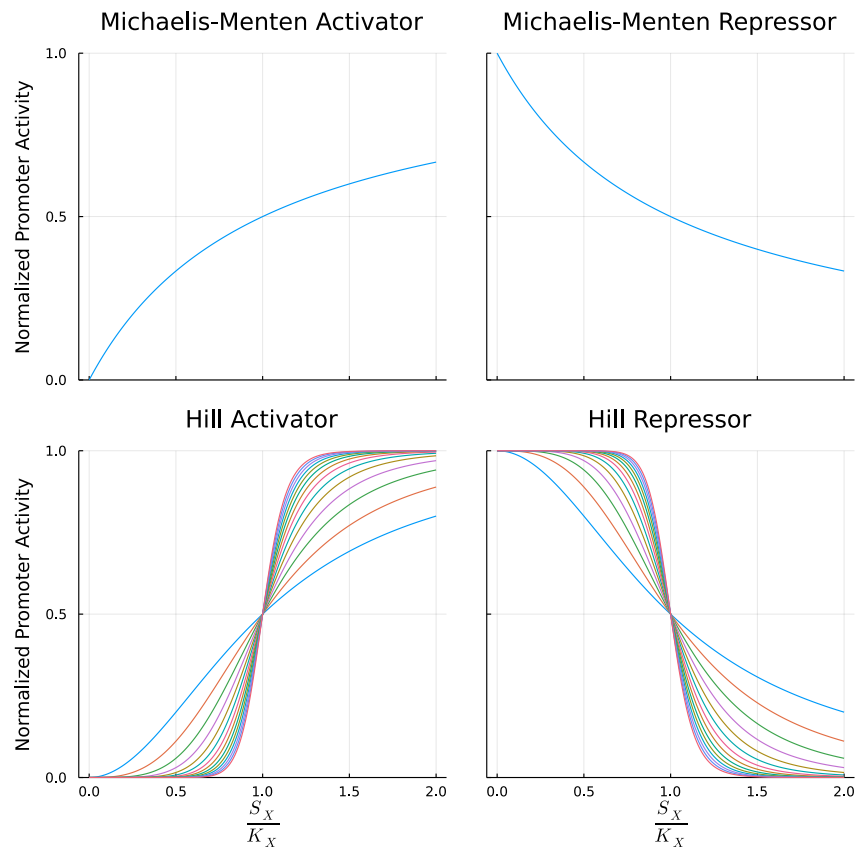
```
[21]: begin
      plot()
      plot!(hs(.5, 3), x, label=L"\lambda = 0.5")
      plot!(hs(1, 3), x, label=L"\lambda = 1")
      plot!(hs(2, 3), x, label=L"\lambda = 2")
      shil = plot!
      ↪(xlabel=L"\frac{S_X}{K_X}",ylabel="Normalized Promoter_
      ↪Activity",title="Shifted Hill", yticks=[0, 0.5, 1.0, 1.5,
      ↪2.0])
      savefig(shil, "ch1_shifted.pdf")
      shil
end
```

[21]:



```
[22]: begin
      figactivity = plot(m1,m2,m3,m4, layout=4,
      ↪size=(750,750))
      figactivity
    end
```

[22]:



```
[23]: # savefig(figactivity, "ch1_activity.pdf")
```