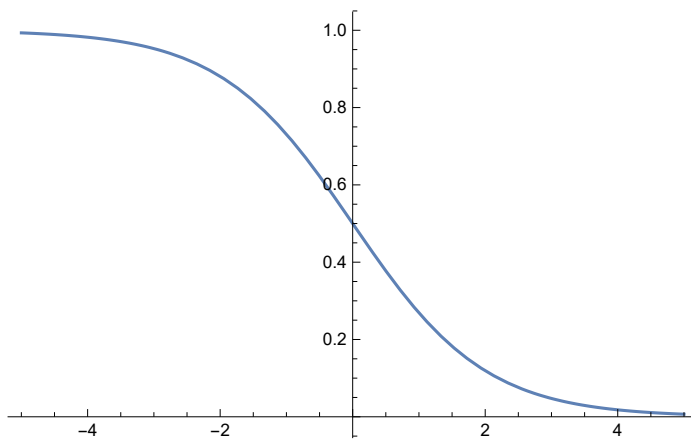


```
In[1]:= F[x_] := 1 / (1 + Exp[x]);  
Plot[F[x], {x, -5, 5}]
```

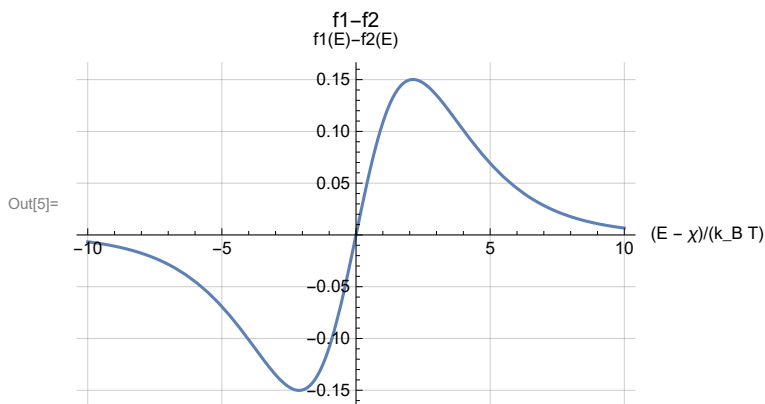
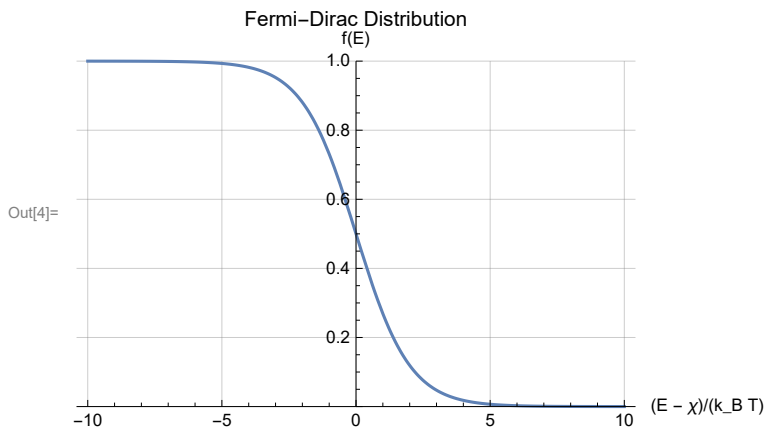
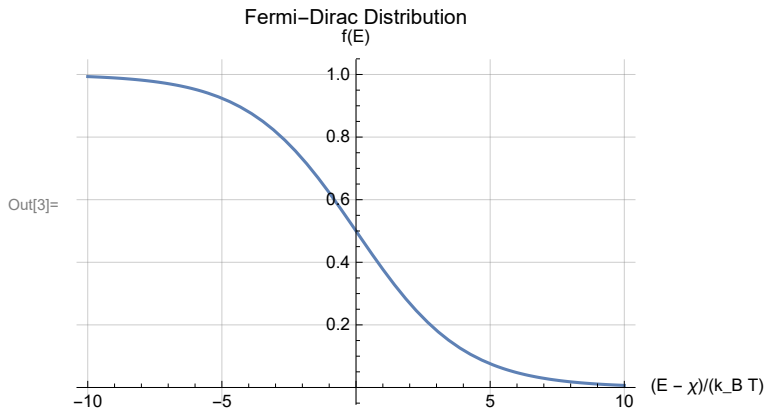
Out[2]=



```

In[3]:= Plot[1 / (Exp[x / 2] + 1), {x, -10, 10}, AxesLabel → {"(E - χ) / (kB T)", "f(E)"},
  PlotLabel → "Fermi-Dirac Distribution", GridLines → Automatic]
Plot[1 / (Exp[x] + 1), {x, -10, 10}, PlotRange → {0, 1},
  AxesLabel → {"(E - χ) / (kB T)", "f(E)"},
  PlotLabel → "Fermi-Dirac Distribution", GridLines → Automatic]
Plot[(1 / (Exp[x / 2] + 1)) - (1 / (Exp[x] + 1)), {x, -10, 10},
  AxesLabel → {"(E - χ) / (kB T)", "f1(E)-f2(E)"},
  PlotLabel → "f1-f2", GridLines → Automatic]

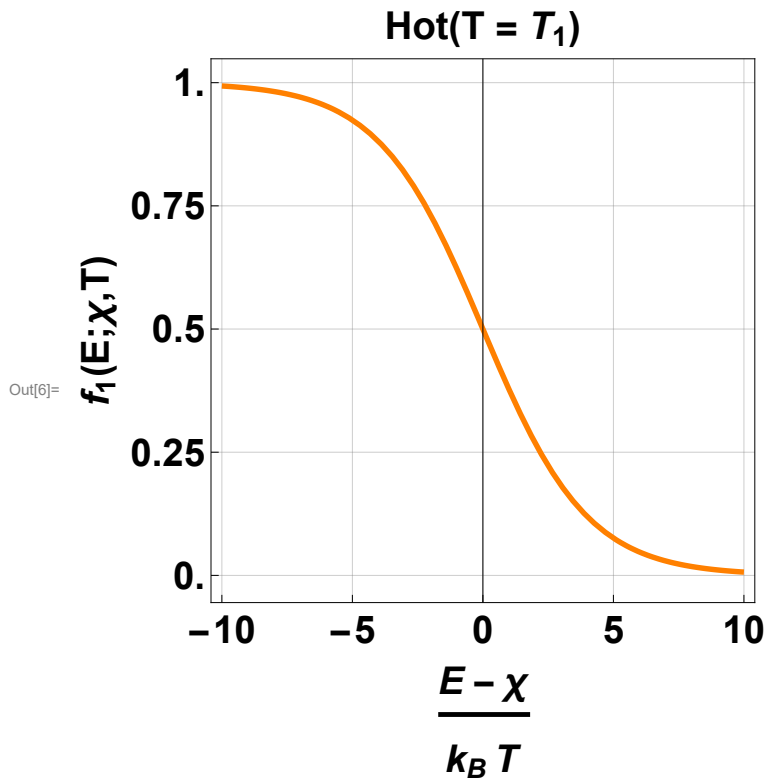
```



```

In[6]:= p1 = Plot[1 / (Exp[x / 2] + 1), {x, -10, 10}, AspectRatio → 1, (*AxesOrigin→{0,0.5},*)
  Axes → True, GridLines → {{-10, -5, 0, 5, 10}, {0.00, .25, 0.50, 0.75, 1.00}},
  PlotTheme → "Scientific", FrameLabel → {{HoldForm["f1(E;χ,T)"], None},
    {HoldForm[" $\frac{E-\chi}{k_B T}$ "], HoldForm["Hot(T = T1)"]}}, AxesStyle → Black,
  LabelStyle → {14, GrayLevel[0], Bold}, FrameStyle → Directive[Black, 20],
  FrameTicks → {{0.00, .25, 0.50, 0.75, 1.00}, None}, {{-10, -5, 0, 5, 10}, None}},
  PlotStyle → {Orange, Thickness[0.01]}]
(*Export["hot_f-22.png",p1,ImageResolution→500]*)
(*Export["hot_f-22.pdf",p1]*)

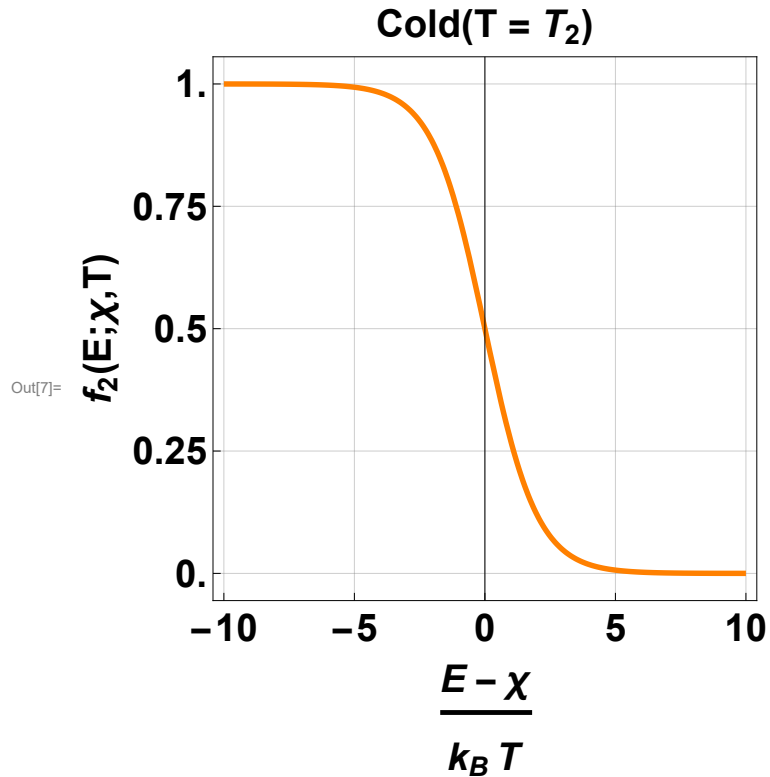
```



```

In[7]:= Plot[1 / (Exp[x] + 1), {x, -10, 10}, AspectRatio → 1, (*AxesOrigin→{0,0.5},*)
  Axes → True, GridLines → {{-10, -5, 0, 5, 10}, {0.00, .25, 0.50, 0.75, 1.00}},
  PlotTheme → "Scientific", FrameLabel →
    {{HoldForm["f2(E;χ,T)"], None}, {HoldForm[" $\frac{E - \chi}{k_B T}$ "], HoldForm["Cold (T = T2)"]}},
  AxesStyle → Black, LabelStyle → {14, GrayLevel[0], Bold},
  FrameStyle → Directive[Black, 20],
  FrameTicks → {{0.00, .25, 0.50, 0.75, 1.00}, None}, {{-10, -5, 0, 5, 10}, None}},
  PlotStyle → {Orange, Thickness[0.01]}]

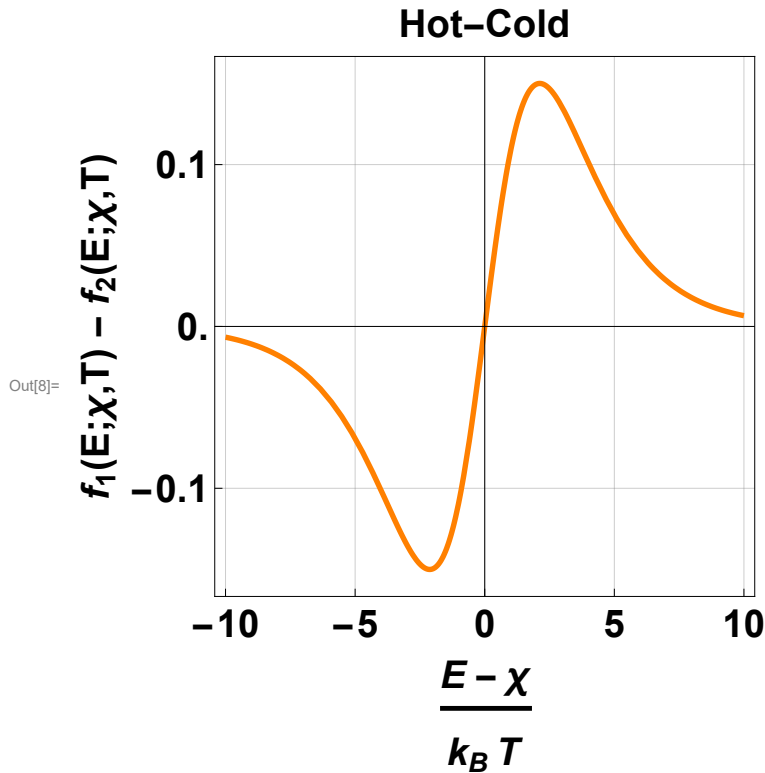
```



```

In[8]:= Plot[(1/(Exp[x/2] + 1)) - (1/(Exp[x] + 1)), {x, -10, 10}, AspectRatio → 1, Axes → True,
  GridLines → {{-10, -5, 0, 5, 10}, {-0.1, 0.0, 0.1}}, PlotTheme → "Scientific", FrameLabel →
  {{HoldForm["f1(E;χ,T) - f2(E;χ,T)"], None}, {HoldForm[" $\frac{E-\chi}{k_B T}$ "], HoldForm["Hot-Cold"]}},
  AxesStyle → Black, LabelStyle → {14, GrayLevel[0], Bold},
  FrameStyle → Directive[Black, 20],
  FrameTicks → {{{-0.1, 0.0, 0.1}, None}, {{-10, -5, 0, 5, 10}, None}},
  PlotStyle → {Orange, Thickness[0.01]}]

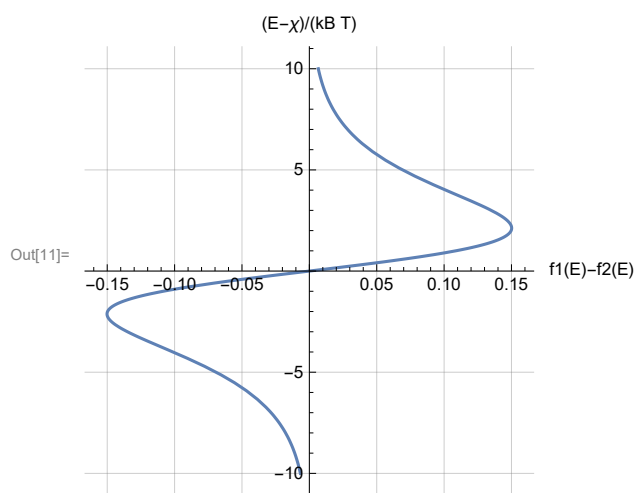
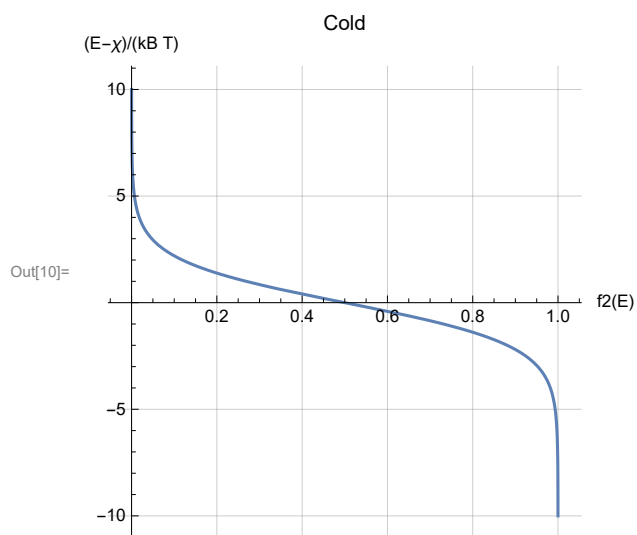
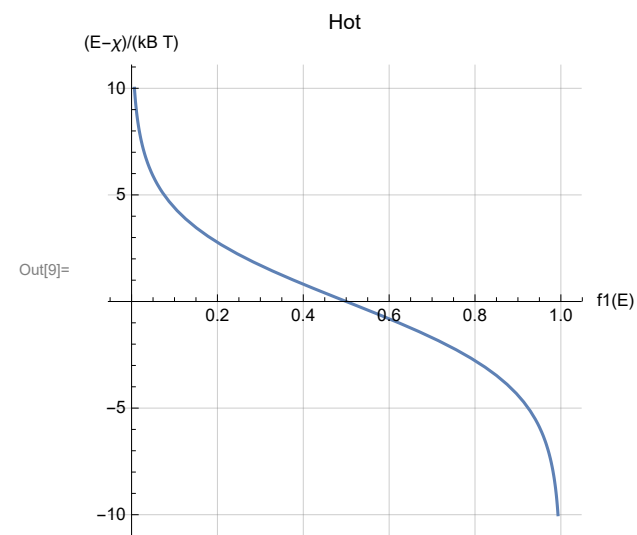
```



```

In[9]:= ParametricPlot[{1/(1 + Exp[x/2]), x}, {x, -10, 10}, AspectRatio → 1,
  AxesLabel → {"f1(E)", "(E-χ)/(kB T)"}, PlotLabel → "Hot", GridLines → Automatic]
ParametricPlot[{1/(1 + Exp[x]), x}, {x, -10, 10}, AspectRatio → 1,
  AxesLabel → {"f2(E)", "(E-χ)/(kB T)"}, PlotLabel → "Cold", GridLines → Automatic]
ParametricPlot[{(1/(1 + Exp[x/2])) - (1/(1 + Exp[x])), x}, {x, -10, 10},
  AspectRatio → 1, AxesLabel → {"f1(E) - f2(E)", "(E-χ)/(kB T)"}, GridLines → Automatic]

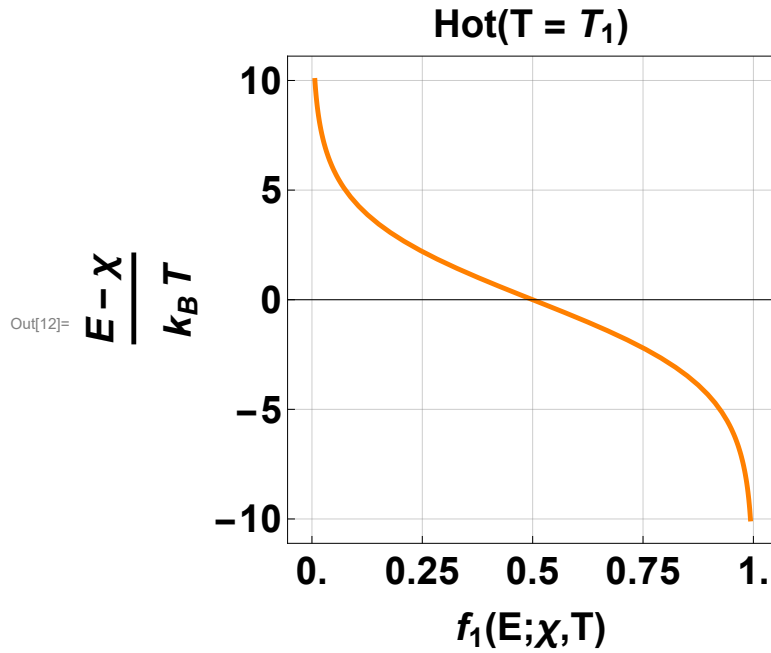
```



```

In[12]:= p1 = ParametricPlot[{1 / (1 + Exp[x / 2]), x},
  {x, -10, 10}, AspectRatio -> 1, (*AxesOrigin->{0.5,0},*) Axes -> True,
  GridLines -> {{0.00, .25, 0.50, 0.75, 1.00}, {-10, -5, 0, 5, 10}},
  PlotTheme -> "Scientific", FrameLabel -> {{HoldForm[" $\frac{E - \chi}{k_B T}$ "], None},
    {HoldForm[" $f_1(E; \chi, T)$ "], HoldForm["Hot(T = T1)"]}}, AxesStyle -> Black,
  LabelStyle -> {14, GrayLevel[0], Bold}, FrameStyle -> Directive[Black, 20],
  FrameTicks -> {{{-10, -5, 0, 5, 10}, None}, {{0.00, .25, 0.50, 0.75, 1.00}, None}},
  PlotStyle -> {Orange, Thickness[0.01]}]

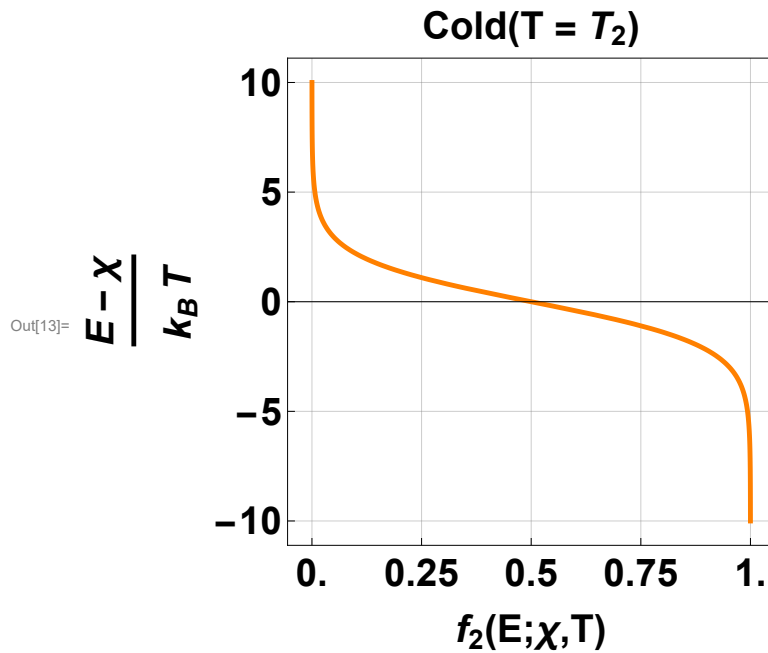
```



```

In[13]:= ParametricPlot[{1/(1 + Exp[x]), x}, {x, -10, 10},
  AspectRatio -> 1, (*AxesOrigin->{0.5,0},*) Axes -> True,
  GridLines -> {{0.00, .25, 0.50, 0.75, 1.00}, {-10, -5, 0, 5, 10}},
  PlotTheme -> "Scientific", FrameLabel -> {{HoldForm[" $\frac{E - \chi}{k_B T}$ "], None},
    {HoldForm[" $f_2(E; \chi, T)$ "], HoldForm["Cold(T = T2)"]}}, AxesStyle -> Black,
  LabelStyle -> {14, GrayLevel[0], Bold}, FrameStyle -> Directive[Black, 20],
  FrameTicks -> {{{-10, -5, 0, 5, 10}, None}, {{0.00, .25, 0.50, 0.75, 1.00}, None}},
  PlotStyle -> {Orange, Thickness[0.01]}]

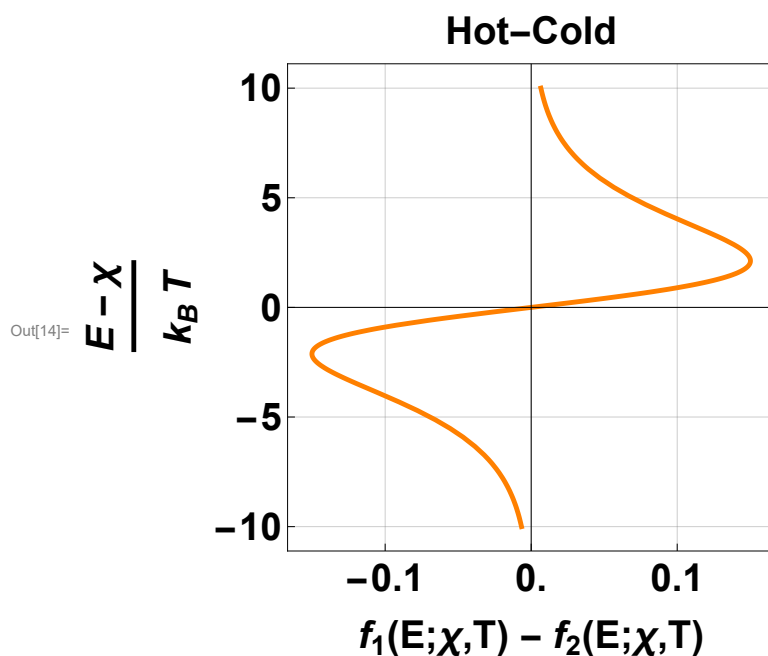
```




```

In[14]:= ParametricPlot[{(1/(1+Exp[x/2])) - (1/(1+Exp[x])), x}, {x, -10, 10},
  AspectRatio -> 1, Axes -> True, GridLines -> {{-0.1, 0.0, 0.1}, {-10, -5, 0, 5, 10}},
  PlotTheme -> "Scientific", FrameLabel -> {{HoldForm[" $\frac{E-\chi}{k_B T}$ "], None},
    {HoldForm[" $f_1(E;\chi,T) - f_2(E;\chi,T)$ "], HoldForm["Hot-Cold"]}}, AxesStyle -> Black,
  LabelStyle -> {14, GrayLevel[0], Bold}, FrameStyle -> Directive[Black, 20],
  FrameTicks -> {{{-10, -5, 0, 5, 10}, None}, {{-0.1, 0.0, 0.1}, None}},
  PlotStyle -> {Orange, Thickness[0.01]}]

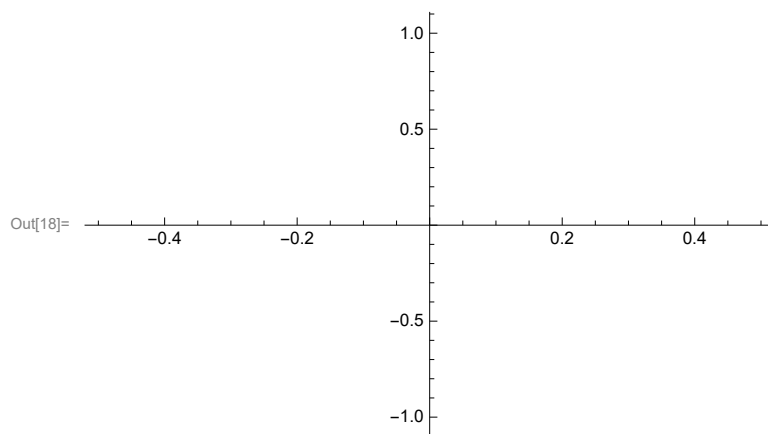
```



```

In[15]:= F[x_] := 1/(1+Exp[x]);
  x[E_] := (E - chi)/(kB * T);
  mu = 0; kB = 8.6 * 10^-5; T = 300;
  Plot[F[x[E]], {E, -0.5, 0.5}]

```

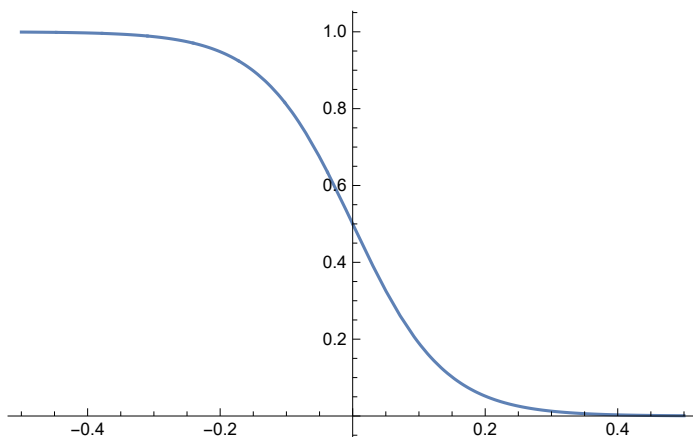


```

In[19]:= F[x_] := 1 / (1 + Exp[x]);
          x[E_] :=  $\frac{E - \chi}{k_B * T}$ ;
           $\chi = 0$ ;  $k_B = 8.6 * 10^{-5}$ ;  $T = 800$ ;
          Plot[F[x[E]], {E, -0.5, 0.5}]

```

Out[22]=



```

In[23]:= F[E_] := 1 / (1 + Exp[ $\frac{E - \chi}{k * T}$ ]);
           $\chi = 0$ ;  $k = 8.6 * 10^{-5}$ ;  $T = 300$ ;
          Plot[F[E], {E, -0.5, 0.5}]

```

Out[25]=

