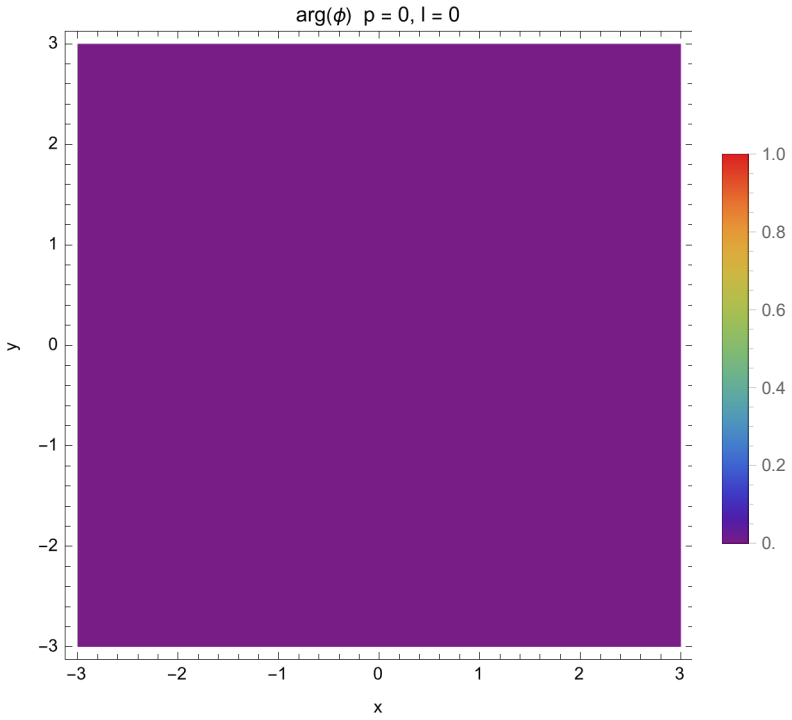
LG Modes Argument Profiles

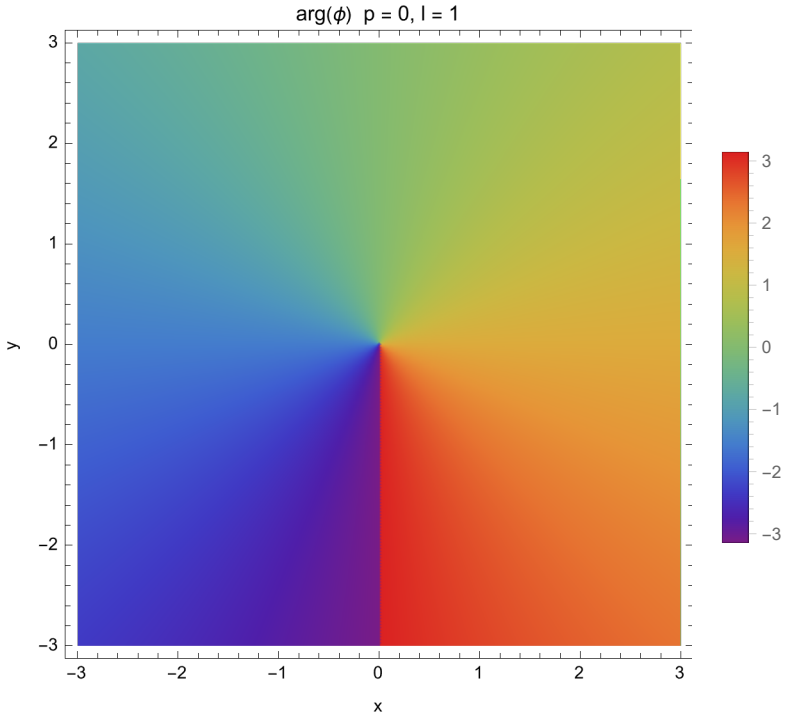
In[•]:=
```
LG[r_, ϕ_, p_, l_, w_] := Sqrt[(2 p!) / (π (p + Abs[l])!)] (1 / w) * Exp[-r^2 / w^2]
  ((r Sqrt[2]) / w)^Abs[l] * LaguerreL[p, Abs[l], (2 r^2) / w^2] Exp[I l ϕ]
DensityPlot[Arg[LG[Sqrt[x^2 + y^2], ArcTan[x, y], 0, 0, 1]], {y, -3, 3},
 {x, -3, 3}, PlotRange → All, ColorFunction → "Rainbow", PlotLegends → Automatic,
 PlotLabel → Row[{Arg[ϕ], "  p = 0, l = 0"}], FrameLabel → {{"y", None}, {"x", None}},
 AxesStyle → Directive[Black, 12], PlotPoints → 100, Exclusions → None]
```

Out[•]=



In[•]:=
```
LG[r_, ϕ_, p_, l_, w_] := Sqrt[(2 p!) / (π (p + Abs[l])!)] (1 / w) * Exp[-r^2 / w^2]
  ((r Sqrt[2]) / w)^Abs[l] * LaguerreL[p, Abs[l], (2 r^2) / w^2] Exp[I l ϕ]
DensityPlot[Arg[LG[Sqrt[x^2 + y^2], ArcTan[x, y], 0, 1, 1]], {y, -3, 3},
 {x, -3, 3}, PlotRange → All, ColorFunction → "Rainbow", PlotLegends → Automatic,
 PlotLabel → Row[{Arg[ϕ], "  p = 0, l = 1"}], FrameLabel → {{"y", None}, {"x", None}},
 AxesStyle → Directive[Black, 12], PlotPoints → 100, Exclusions → None]
```

Out[•]=



In[•]:=
```
LG[r_, ϕ_, p_, l_, w_] := Sqrt[(2 p !) / (π (p + Abs[l]) !)] (1 / w) * Exp[-r^2 / w^2]
  ((r Sqrt[2]) / w)^Abs[l] * LaguerreL[p, Abs[l], (2 r^2) / w^2] Exp[I l ϕ]
DensityPlot[Arg[LG[Sqrt[x^2 + y^2], ArcTan[x, y], 0, 2, 1]], {y, -3, 3},
 {x, -3, 3}, PlotRange → All, ColorFunction → "Rainbow", PlotLegends → Automatic,
 PlotLabel → Row[{Arg[ϕ], "  p = 0, l = 2"}], FrameLabel → {{"y", None}, {"x", None}},
 AxesStyle → Directive[Black, 12], PlotPoints → 100, Exclusions → None]
```

Out[•]=