

Pensieve Header: Plotting 2-variable polynomials.

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Print[
  "Loading PolyPlot.m from http://drorbn.net/v25/ap to plot 2-variable polynomials."]
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Loading PolyPlot.m from http://drorbn.net/ubc24/ap to plot 2-variable polynomials.

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In[*]:= Options[PolyPlot1] = {Labeled -> False};
PolyPlot1[Δ_, OptionsPattern[]] := Module[{crs, m, maxc, minc, s, rect},
  rect = {{0, 0}, {1, 0}, {1, 1}, {0, 1}};
  If[Expand[Δ] === 0, Graphics[]],
  m = Max[-Exponent[Δ, T, Min], Exponent[Δ, T, Max]];
  crs = CoefficientRules[T^m Δ, {T}];
  maxc = N@Log@Max@Abs[Last /@ crs];
  minc = N@Log@Min@Select[Abs[Last /@ crs], # > 0 &];
  If[minc == maxc, s[_] = 0, s[_] := s[c] = (maxc - Log@c) / (maxc - minc)];
  Graphics[crs /. ({x_} -> c_) -> {
    Lighter[Which[c == 0, White, c > 0, Red, c < 0, Blue], 0.88 s[Abs@c]],
    Tooltip[Polygon[{(x + m - 1/2, 0) + #} & /@ rect], c T^{x-m}],
    If[Not@OptionValue[Labeled], {},
      {Black, FontSize -> Scaled[1 / ((m + 1) (6 + maxc))], Text[c T^{x-m}, {x + m, 0.5}]}]
  }, AspectRatio -> Min[1/5, 1 / Sqrt[m + 1]],
  ImagePadding -> None, PlotRangePadding -> None]
];

Options[PolyPlot2] = {Labeled -> False};
PolyPlot2[θ_, OptionsPattern[]] := Module[{crs, m1, m2, maxc, minc, s, hex, p},
  If[Expand[θ] === 0, Graphics[{White, Disk[]}],
  hex = Table[{Cos[α], Sin[α]} / Cos[2π/12]/2, {α, 2π/12, 2π, 2π/6}];
  m1 = Max[-Exponent[θ, T1, Min], Exponent[θ, T1, Max]];
  m2 = Max[-Exponent[θ, T2, Min], Exponent[θ, T2, Max]];
  crs = CoefficientRules[T1^m1 T2^m2 θ, {T1, T2}];
  maxc = N@Log@Max@Abs[Last /@ crs];
  minc = N@Log@Min@Select[Abs[Last /@ crs], # > 0 &];
  If[minc == maxc, s[_] = 0, s[_] := s[c] = (maxc - Log@c) / (maxc - minc)];
  Graphics[{(*{Yellow, Disk[{0, 0], 1 + Cos[2π/12] Norm[{m1, m2}]} / Sqrt[2]}), (*
    crs /. ({x1_, x2_} -> c_) -> {
      Lighter[Which[c == 0, White, c > 0, Red, c < 0, Blue], 0.88 s[Abs@c]],
      p = (1 - 1/2 / Sqrt[3]) . {x1 - m1, x2 - m2};
      Tooltip[Polygon[(p + #) & /@ hex], c T1^{x1-m1} T2^{x2-m2}],
    }
  ]
];
```

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If[Not@OptionValue[Labeled], {},
  {Black, FontSize → Scaled[ $\frac{1}{\text{Max}[m1, m2] (10 + \text{maxc})}$ ], Text[c T1x1-m1 T2x2-m2, p]]}
}, ImagePadding → None, PlotRangePadding → None]
];
PolyPlot[{Δ, θ}, opts___Rule] := GraphicsColumn[
  {PolyPlot1[Δ, FilterRules[{opts}, Options[PolyPlot1]]],
   PolyPlot2[θ, FilterRules[{opts}, Options[PolyPlot2]]]},
  Spacings → Scaled@0.08, ImagePadding → None, PlotRangePadding → None,
  FilterRules[{opts}, Options[GraphicsColumn]]
];

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In[]:= PolyPlot@ $\left\{-1 + \frac{1}{T} + T, -\frac{1}{T_1^2} - T_1^2 - \frac{1}{T_2^2} - \frac{1}{T_1^2 T_2^2} + \frac{1}{T_1 T_2^2} + \frac{1}{T_1^2 T_2} + \frac{T_1}{T_2} + \frac{T_2}{T_1} + T_1^2 T_2 - T_2^2 + T_1 T_2^2 - T_1^2 T_2^2\right\}$

Out[]=

