

In this code α and β are the orders of the elliptic generators so

and are code elliptic generators in orders so the ² this $\alpha\beta$

Generators of order 5, 5

$$\alpha = e^{i\pi/5};$$

$$\beta = e^{i\pi/5};$$

The recursion formula depends on whether the numerator of the Farey fraction is odd or even

depends seven Farey formula fraction is numerator odd or even recursion the ² The whether

LeftFraction[p_, q_] :=

(frac = FareySequence[q, Position[FareySequence[q], p/q][[1]][[1]] - 1];
{Numerator[frac], Denominator[frac]});

RightFraction[p_, q_] :=

(frac = FareySequence[q, Position[FareySequence[q], p/q][[1]][[1]] + 1];
{Numerator[frac], Denominator[frac]});

ClearAll[FareyPolynomial]

$$\text{FareyPolynomial}[0, 1, \alpha, \beta] := \frac{\alpha}{\beta} + \frac{\beta}{\alpha} - z;$$

$$\text{FareyPolynomial}[1, 1, \alpha, \beta] := \alpha\beta + \frac{1}{\alpha\beta} + z;$$

$$\text{FareyPolynomial}[1, 2, \alpha, \beta] := 2 + \left(\alpha\beta - \frac{\alpha}{\beta} - \frac{\beta}{\alpha} + \frac{1}{\alpha\beta} \right) z + z^2;$$

FareyPolynomial[p_, q_, α , β] := Module[{p1, p2, q1, q2},

{p1, q1} = LeftFraction[p, q];

{p2, q2} = RightFraction[p, q];

Expand[4 + 1/ α^2 + α^2 + 1/ β^2 + β^2 - FareyPolynomial[p1, q1, α , β] * FareyPolynomial[p2, q2, α , β] -

FareyPolynomial[Abs[p2 - p1], Abs[q2 - q1], α , β]]]/EvenQ[q];

```

FareyPolynomial[p_., q_.,  $\alpha$ _,  $\beta$ _.] := Module[{p1, p2, q1, q2},
{p1, q1} = LeftFraction[p, q];
{p2, q2} = RightFraction[p, q];
Expand [2 ( $\alpha\beta + \frac{\alpha}{\beta} + \frac{\beta}{\alpha} + \frac{1}{\alpha\beta}$ ) - FareyPolynomial[p1, q1,  $\alpha$ ,  $\beta$ ] * FareyPolynomial[p2, q2,  $\alpha$ ,  $\beta$ ] -
FareyPolynomial[Abs[p2 - p1], Abs[q2 - q1],  $\alpha$ ,  $\beta$ ]]]/OddQ[q];

```

FareyPolynomial[1, 3, α , β]

$$e^{-\frac{2i\pi}{5}} + e^{\frac{2i\pi}{5}} + 5z - 2e^{-\frac{2i\pi}{5}}z - 2e^{\frac{2i\pi}{5}}z - 4z^2 + e^{-\frac{2i\pi}{5}}z^2 + e^{\frac{2i\pi}{5}}z^2 + z^3$$

$B = \{\text{FareyPolynomial}[1, 2, \alpha, \beta],$

$\text{FareyPolynomial}[1, 3, \alpha, \beta],$

$\text{FareyPolynomial}[1, 4, \alpha, \beta],$

$\text{FareyPolynomial}[3, 4, \alpha, \beta],$

$\text{FareyPolynomial}[1, 5, \alpha, \beta],$

$\text{FareyPolynomial}[2, 5, \alpha, \beta],$

$\text{FareyPolynomial}[3, 5, \alpha, \beta],$

$\text{FareyPolynomial}[4, 5, \alpha, \beta],$

$\text{FareyPolynomial}[1, 6, \alpha, \beta],$

$\text{FareyPolynomial}[5, 6, \alpha, \beta],$

$\text{FareyPolynomial}[1, 7, \alpha, \beta],$

$\text{FareyPolynomial}[2, 7, \alpha, \beta],$

$\text{FareyPolynomial}[3, 7, \alpha, \beta],$

$\text{FareyPolynomial}[4, 7, \alpha, \beta],$

$\text{FareyPolynomial}[5, 7, \alpha, \beta],$

$\text{FareyPolynomial}[6, 7, \alpha, \beta],$

$\text{FareyPolynomial}[1, 8, \alpha, \beta],$

$\text{FareyPolynomial}[3, 8, \alpha, \beta],$

```

FareyPolynomial[5, 8,  $\alpha$ ,  $\beta$ ],
FareyPolynomial[7, 8,  $\alpha$ ,  $\beta$ ],
FareyPolynomial[1, 9,  $\alpha$ ,  $\beta$ ],
FareyPolynomial[2, 9,  $\alpha$ ,  $\beta$ ],
FareyPolynomial[4, 9,  $\alpha$ ,  $\beta$ ],
FareyPolynomial[5, 9,  $\alpha$ ,  $\beta$ ],
FareyPolynomial[7, 9,  $\alpha$ ,  $\beta$ ],
FareyPolynomial[8, 9,  $\alpha$ ,  $\beta$ ]}

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Length[B]

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26

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Result = {};
For[i = 1, i < Length[B] + 1, i++,
{ $\gamma$  = NRoots[B[[i]] == -2, z];
{Result = AppendTo[Result, N[ $\gamma$ ]], Print[N[ $\gamma$ ], i]}}]

```

```

Length[Result]

```

26

```

List1 = {"0.690983" - "1.87684" $i$ , "0.690983" + "1.87684" $i$ ,
"1.92586" - "1.36541" $i$ ,
"1.92586" + "1.36541" $i$ ,
"0.190842" - "0.728549" $i$ ,
"0.190842" + "0.728549" $i$ ,
"2.50014" - "0.895225" $i$ ,
"2.50014" + "0.895225" $i$ ,
- "1.11818" - "0.895225" $i$ , - "1.11818" + "0.895225" $i$ ,
"1.19112" - "0.728549" $i$ ,

```

$"1.19112" + "0.728549"i,$
 $"0.918728" - "0.890982"i,$
 $"0.918728" + "0.890982"i,$
 $"2.86585" - "0.570883"i,$
 $"2.86585" + "0.570883"i,$
 $"0.0582185" - "0.709119"i,$
 $"0.0582185" + "0.709119"i,$
 $"1.37801" - "1.50946"i,$
 $"1.37801" + "1.50946"i,$
 $"0.0039571" - "1.50946"i, "0.0039571" + "1.50946"i,$
 $"1.32375" - "0.709119"i,$
 $"1.32375" + "0.709119"i,$
 $- "1.48388" - "0.570883"i,$
 $- "1.48388" + "0.570883"i,$
 $"0.463238" - "0.890982"i,$
 $"0.463238" + "0.890982"i,$
 $"0.103027" - "0.362728"i, "0.103027" + "0.362728"i,$
 $"1.45977" - "0.83935"i,$
 $"1.45977" + "0.83935"i,$
 $"3.12818" - "0.368897"i,$
 $"3.12818" + "0.368897"i,$
 $- "1.74622" - "0.368897"i,$
 $- "1.74622" + "0.368897"i,$
 $- "0.0778079" - "0.83935"i,$
 $- "0.0778079" + "0.83935"i,$
 $"1.27894" - "0.362728"i, "1.27894" + "0.362728"i,$
 $"0.557446" - "0.539075"i,$

$$\begin{aligned}
& "0.557446" + "0.539075"i, \\
& "1.86471" - "0.705301"i, \\
& "1.86471" + "0.705301"i, \\
& "3.3183" - "0.246765"i, \\
& "3.3183" + "0.246765"i, -"0.11656" - "0.367484"i, -"0.11656" + "0.367484"i, \\
& "1.16029" - "0.801042"i, \\
& "1.16029" + "0.801042"i, \\
& "2.19759" - "1.05113"i, \\
& "2.19759" + "1.05113"i, \\
& "0.428636" - "1.13046"i, \\
& "0.428636" + "1.13046"i, \\
& "1.12079" - "1.56974"i, \\
& "1.12079" + "1.56974"i, \\
& "1.60399" - "0.647211"i, \\
& "1.60399" + "0.647211"i, \\
& -"0.222019" - "0.647211"i, -"0.222019" + "0.647211"i, \\
& "0.261172" - "1.56974"i, \\
& "0.261172" + "1.56974"i, \\
& "0.95333" - "1.13046"i, \\
& "0.95333" + "1.13046"i, \\
& -"0.815623" - "1.05113"i, -"0.815623" + "1.05113"i, "0.221681" - "0.801042"i, \\
& "0.221681" + "0.801042"i, "1.49853" - "0.367484"i, "1.49853" + "0.367484"i, \\
& -"1.93633" - "0.246765"i, -"1.93633" + "0.246765"i, -"0.482741" - "0.705301"i, \\
& -"0.482741" + "0.705301"i,
\end{aligned}$$

$"0.82452" - "0.539075"i,$
 $"0.82452" + "0.539075"i,$
 $"0.0643538" - "0.211919"i, "0.0643538" + "0.211919"i, "0.978443" - "0.611947"i,$
 $"0.978443" + "0.611947"i,$
 $"2.1915" - "0.555998"i,$
 $"2.1915" + "0.555998"i,$
 $"3.45668" - "0.171452"i,$
 $"3.45668" + "0.171452"i,$
 $- "0.144481" - "0.349367"i, - "0.144481" + "0.349367"i,$
 $"0.857759" - "0.990248"i,$
 $"0.857759" + "0.990248"i,$
 $"1.58089" - "1.40007"i,$
 $"1.58089" + "1.40007"i,$
 $"1.77878" - "0.701658"i,$
 $"1.77878" + "0.701658"i,$
 $- "0.396812" - "0.701658"i, - "0.396812" + "0.701658"i, - "0.198927" - "1.40007"i,$

 $- "0.198927" + "1.40007"i,$
 $"0.524207" - "0.990248"i,$
 $"0.524207" + "0.990248"i,$
 $"1.52645" - "0.349367"i,$
 $"1.52645" + "0.349367"i,$
 $- "2.07472" - "0.171452"i, - "2.07472" + "0.171452"i, - "0.809537" - "0.555998"i,$

 $- "0.809537" + "0.555998"i,$
 $"0.403523" - "0.611947"i,$
 $"0.403523" + "0.611947"i,$

$"1.31761" - "0.211919"i,$
 $"1.31761" + "0.211919"i,$
 $"0.370526" - "0.34195"i, "0.370526" + "0.34195"i,$
 $"1.32628" - "0.611471"i,$
 $"1.32628" + "0.611471"i,$
 $"2.46573" - "0.427149"i,$
 $"2.46573" + "0.427149"i,$
 $"3.55885" - "0.123316"i,$
 $"3.55885" + "0.123316"i, "0.00431521" - "0.250923"i, "0.00431521" + "0.250923"i,$
 $"0.589039" - "0.755691"i,$
 $"0.589039" + "0.755691"i,$
 $"1.76918" - "0.498718"i,$
 $"1.76918" + "0.498718"i,$
 $"2.66223" - "0.675174"i,$
 $"2.66223" + "0.675174"i,$
 $"0.0490414" - "0.326734"i, "0.0490414" + "0.326734"i, "0.56834" - "1.39442"i,$
 $"0.56834" + "1.39442"i,$
 $"0.96969" - "1.61669"i,$
 $"0.96969" + "1.61669"i, "1.3854" - "0.976406"i,$
 $"1.3854" + "0.976406"i, -"0.00343348" - "0.976406"i, -"0.00343348" + "0.976406"i,$
 $"0.412276" - "1.61669"i,$
 $"0.412276" + "1.61669"i,$
 $"0.813626" - "1.39442"i,$
 $"0.813626" + "1.39442"i, "1.33292" - "0.326734"i,$
 $"1.33292" + "0.326734"i,$
 $- "1.28027" - "0.675174"i,$
 $- "1.28027" + "0.675174"i,$

$-“0.387217” - “0.498718”i, -“0.387217” + “0.498718”i,$
 $“0.792927” - “0.755691”i,$
 $“0.792927” + “0.755691”i,$
 $“1.37765” - “0.250923”i, “1.37765” + “0.250923”i, -“2.17689” - “0.123316”i,$
 $-“2.17689” + “0.123316”i, -“1.08376” - “0.427149”i, -“1.08376” + “0.427149”i,$

 $“0.0556899” - “0.611471”i, “0.0556899” + “0.611471”i, “1.01144” - “0.34195”i,$
 $“1.01144” + “0.34195”i\};$

Result2 = {};

For[$j = 1, j < \text{Length}[\text{List1}] + 1, j++$,
 If $\left[\left(\frac{\text{Re}[\text{List1}[[j]] - .6}{2.1} \right)^2 + \left(\frac{\text{Im}[\text{List1}[[j]]]}{1.5} \right)^2 > 1, \right.$
 $\{\text{Result2} = \text{AppendTo}[\text{Result2}, \text{List1}[[j]], \text{Print}[\text{List1}[[j]]]\};$

Length[Result2]

50

Result2[[1]]

$0.690983 - 1.87684i$

E1 = ListPlot[ReIm[Result2], PlotStyle → Red, PlotRange → {{-4, 5}, {-4, 4}}]

L = FareySequence[40];

Roots55 = {};

For[$n = 1, n \leq \text{Length}[L], n++$, If[Max[ContinuedFraction[L[[n]]]] < 15,

{ $p = \text{Numerator}[L[[n]]$; $q = \text{Denominator}[L[[n]]$;

$X = \text{NRoots}[\text{FareyPolynomial}[p, q, \alpha, \beta] == -2, z, 10]$;

For[$m = 1, m \leq \text{Length}[X], m++$, Roots55 = Append[Roots55, {Re[X[[m]][[2]], Im[X[[m]][[2]]]}]]]

Length[Roots55]

11030

```
ListPlot[Roots55, PlotStyle → Black, PlotRange → {{-4, 5}, {-4, 4}}]
```

Pic55 =

```
Result4 = {};
```

```
For[i = 1, i < Length[B] + 1, i++,
```

```
{G2 = Solve[B[[i]] == s, z];
```

```
{Result4 = AppendTo[Result4, G2], Print[G2]}]}
```

```
A6 = Flatten[N[z]/.Result4];
```

```
Length[A6]
```

173

```
Length[Result4]
```

26

```
l1 = ParametricPlot[{Re[A6[[1]]], Im[A6[[1]]]}, {s, -20, -2}]
```

```
l10 = ParametricPlot[{Re[A6[[10]]], Im[A6[[10]]]}, {s, -10, -2}, MaxRecursion → 1]
```

```
l3 = ParametricPlot[{Re[A6[[3]]], Im[A6[[3]]]}, {s, -10, -2}, MaxRecursion → 2]
```

```
ll3 = ParametricPlot[{2Re[A6[[1]]] - Re[A6[[3]]], Im[A6[[3]]]}, {s, -10, -2}, MaxRecursion → 2]
```

```
l4 = ParametricPlot[{Re[A6[[4]]], Im[A6[[4]]]}, {s, -10, -2}]
```

```
ll4 = ParametricPlot[{2Re[A6[[1]]] - Re[A6[[4]]], Im[A6[[4]]]}, {s, -10, -2}, MaxRecursion → 2]
```

```
l2 = ParametricPlot[{Re[A6[[2]]], Im[A6[[2]]]}, {s, -10, -2}]
```

```
ll2 = ParametricPlot[{2Re[A6[[1]]] - Re[A6[[2]]], Im[A6[[2]]]}, {s, -10, -2}, MaxRecursion → 2]
```

```
l26 = ParametricPlot[{Re[A6[[26]]], Im[A6[[26]]]}, {s, -20, -2}, MaxRecursion → 2]
```

```

l25 = ParametricPlot[{Re[A6[[25]]], Im[A6[[25]]]}, {s, -20, -2}, MaxRecursion → 1]

l30 = ParametricPlot[{Re[A6[[30]]], Im[A6[[30]]]}, {s, -20, -2}, MaxRecursion → 2]

l29 = ParametricPlot[{Re[A6[[29]]], Im[A6[[29]]]}, {s, -20, -2}, MaxRecursion → 2]

l40 = ParametricPlot[{Re[A6[[40]]], Im[A6[[40]]]}, {s, -20, -2}, MaxRecursion → 2]

l41 = ParametricPlot[{Re[A6[[41]]], Im[A6[[41]]]}, {s, -20, -2}, MaxRecursion → 1]

l76 = ParametricPlot[{Re[A6[[76]]], Im[A6[[76]]]}, {s, -20, -2}, MaxRecursion → 2]

l75 = ParametricPlot[{Re[A6[[75]]], Im[A6[[75]]]}, {s, -20, -2}, MaxRecursion → 1]

l82 = ParametricPlot[{Re[A6[[82]]], Im[A6[[82]]]}, {s, -20, -2}, MaxRecursion → 2]

l81 = ParametricPlot[{Re[A6[[81]]], Im[A6[[81]]]}, {s, -20, -2}, MaxRecursion → 1]

l106 = ParametricPlot[{Re[A6[[106]]], Im[A6[[106]]]}, {s, -20, -2}, MaxRecursion → 1]

l107 = ParametricPlot[{Re[A6[[107]]], Im[A6[[107]]]}, {s, -20, -2}, MaxRecursion → 1]

Result3 = {};
For[i = 1, i < Length[B] + 1, i++,
{G1 = Solve[B[[i]] == -2 + ti, z];
{Result3 = AppendTo[Result3, G1], Print[G1]}}]

Length[Result3]

26

A5 = Flatten[N[z]/.Result3]

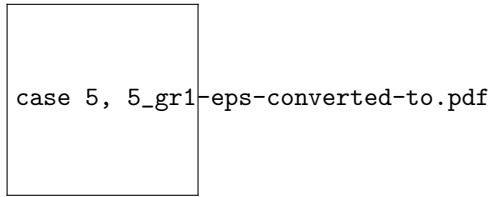
Length[A5]

173

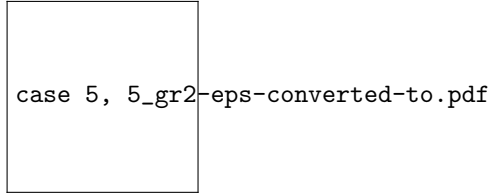
Show[Pic55, E1, l1, l2, ll2, ll3, ll4, l25, l26, l29, l30, l40, l41, l75, l76, l81, l82, l106, l107, l110, c1, cc1, ccc1, cccc1, c2,

```

cc2, ccc2, c3, cc3, ccc3, cccc3, b3, bb3, bbb3, bbbb3, cc4, cccc4, bb4, bbbb4, c10, cc10, ccc10, cccc10, b10, bb10, bbb10, c11, cc11, ccc11, cccc11, b11, bb11, bbb11, bbbb11, c17, cc17, b17, cccc17, bbb17, bb17, c26, cc26, ccc26, cccc26, b26, ccc26, cccc26, c106, cc106, ccc106, cccc106, b106, bb106, bbb106, bbbb106, c107, cc107, ccc107, cccc107, b107, bb107, bbb107, c30, cc30, ccc30, cccc30, b30, bb30, bbb30, bbbb30, c40, cc40, c76, cc76, ccc76, cccc76, b76, bb76, bbb76, bbbb76, c76, cc76, ccc76, cccc76, b82, bb82, c82, cc82, ccc82, cccc82, b82, bb82, bbb82, bbbb82, bbb40, bbbb40, c25, cc25, ccc25, cccc25, b25, bb25, bbb25, c29, ccc29, cccc29, b29, bb29, bbb29, bbbb29, c41, cc41, ccc41, cccc41, b41, bb41, bbb41, bbbb41, c75, cc75, ccc75, cccc75, b75, bbb75, bbbb75, c81, cc81, ccc81, cccc81, b81, bb81, bbb81, bbbb81, PlotRange $\rightarrow \{\{-4, 5\}, \{-4, 4\}\}$



Pic99 =



c1 = ParametricPlot[{Re[A5[[1]]], Im[A5[[1]]], {t, -30, -0.0001}, MaxRecursion \rightarrow 1]

cc1 = ParametricPlot[{Re[A5[[1]]], Im[A5[[1]]], {t, 0.0001, 30}, MaxRecursion \rightarrow 1]

c2 = ParametricPlot[{Re[A5[[2]]], Im[A5[[2]]], {t, -30, -0.0001}, MaxRecursion \rightarrow 1]

cc2 = ParametricPlot[{Re[A5[[2]]], Im[A5[[2]]], {t, 0.0001, 30}, MaxRecursion \rightarrow 1]

ccc2 = ParametricPlot[{Re[A5[[2]]], -Im[A5[[2]]], {t, -30, -0.0001}, MaxRecursion \rightarrow 1]

c3 = ParametricPlot[{Re[A5[[3]]], Im[A5[[3]]], {t, -30, -0.0001}, MaxRecursion \rightarrow 1]

cc3 = ParametricPlot[{Re[A5[[3]]], Im[A5[[3]]], {t, 0.0001, 30}, MaxRecursion \rightarrow 1]

ccc3 = ParametricPlot[{Re[A5[[3]]], -Im[A5[[3]]], {t, -30, -0.0001}, MaxRecursion \rightarrow 1]

cccc3 = ParametricPlot[{Re[A5[[3]]], -Im[A5[[3]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

bb3 = ParametricPlot[{2(“0.690983”) - Re[A5[[3]]], Im[A5[[3]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

bbb3 = ParametricPlot[{2(“0.690983”) - Re[A5[[3]]], -Im[A5[[3]]]}, {t, -30, -0.0001}, MaxRecursion → 1]

bbbb3 = ParametricPlot[{2(“0.690983”) - Re[A5[[3]]], -Im[A5[[3]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

b3 = ParametricPlot[{2(“0.690983”) - Re[A5[[3]]], Im[A5[[3]]]}, {t, -30, -0.0001}, MaxRecursion → 1]

c4 = ParametricPlot[{Re[A5[[4]]], Im[A5[[4]]]}, {t, -30, -0.0001}, MaxRecursion → 1]

cc4 = ParametricPlot[{Re[A5[[4]]], Im[A5[[4]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

ccc4 = ParametricPlot[{Re[A5[[4]]], -Im[A5[[4]]]}, {t, -30, -0.0001}, MaxRecursion → 1]

cccc4 = ParametricPlot[{Re[A5[[4]]], -Im[A5[[4]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

b4 = ParametricPlot[{2(“0.690983”) - Re[A5[[4]]], Im[A5[[4]]]}, {t, -30, -0.0001}, MaxRecursion → 1]

bb4 = ParametricPlot[{2(“0.690983”) - Re[A5[[4]]], Im[A5[[4]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

bbb4 = ParametricPlot[{2(“0.690983”) - Re[A5[[4]]], -Im[A5[[4]]]}, {t, -30, -0.0001}, MaxRecursion → 1]

bbbb4 = ParametricPlot[{2(“0.690983”) - Re[A5[[4]]], -Im[A5[[4]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

c10 = ParametricPlot[{Re[A5[[10]]], Im[A5[[10]]]}, {t, -30, -0.0001}, MaxRecursion → 1]

cc10 = ParametricPlot[{Re[A5[[10]]], Im[A5[[10]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

ccc10 = ParametricPlot[{Re[A5[[10]]], -Im[A5[[10]]]}, {t, -30, -0.0001}, MaxRecursion → 1]

cccc10 = ParametricPlot[{Re[A5[[10]]], -Im[A5[[10]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

b10 = ParametricPlot[{2(“0.690983”) - Re[A5[[10]]], Im[A5[[10]]]}, {t, -30, -0.0001}, MaxRecursion → 1]

bb10 = ParametricPlot[{2(“0.690983”) - Re[A5[[10]]], Im[A5[[10]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

bbb10 = ParametricPlot[{2(“0.690983”) - Re[A5[[10]]], -Im[A5[[10]]]}, {t, -30, -0.0001}, MaxRecursion → 1]

bbbb10 = ParametricPlot[{2(“0.690983”) - Re[A5[[10]]], -Im[A5[[10]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

```

c11 = ParametricPlot[{Re[A5[[11]]], Im[A5[[11]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cc11 = ParametricPlot[{Re[A5[[11]]], Im[A5[[11]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
ccc11 = ParametricPlot[{Re[A5[[11]]], -Im[A5[[11]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cccc11 = ParametricPlot[{Re[A5[[11]]], -Im[A5[[11]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
b11 = ParametricPlot[{2("0.690983") - Re[A5[[11]]], Im[A5[[11]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bb11 = ParametricPlot[{2("0.690983") - Re[A5[[11]]], Im[A5[[11]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
bbb11 = ParametricPlot[{2("0.690983") - Re[A5[[11]]], -Im[A5[[11]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bbbb11 = ParametricPlot[{2("0.690983") - Re[A5[[11]]], -Im[A5[[11]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

```

```

c17 = ParametricPlot[{Re[A5[[17]]], Im[A5[[17]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cc17 = ParametricPlot[{Re[A5[[17]]], Im[A5[[17]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
ccc17 = ParametricPlot[{Re[A5[[17]]], -Im[A5[[39]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cccc17 = ParametricPlot[{Re[A5[[17]]], -Im[A5[[17]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
b17 = ParametricPlot[{2("0.690983") - Re[A5[[17]]], Im[A5[[17]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bb17 = ParametricPlot[{2("0.690983") - Re[A5[[17]]], Im[A5[[17]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
bbb17 = ParametricPlot[{2("0.690983") - Re[A5[[17]]], -Im[A5[[17]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bbbb17 = ParametricPlot[{2("0.690983") - Re[A5[[39]]], -Im[A5[[17]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

```

```

c26 = ParametricPlot[{Re[A5[[26]]], Im[A5[[26]]]}, {t, -30, -0.0001}, MaxRecursion → 1]

```

```

cc26 = ParametricPlot[{Re[A5[[26]]], Im[A5[[26]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
ccc26 = ParametricPlot[{Re[A5[[26]]], -Im[A5[[26]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cccc26 = ParametricPlot[{Re[A5[[26]]], -Im[A5[[26]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
b26 = ParametricPlot[{2("0.690983") - Re[A5[[26]]], Im[A5[[26]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bb26 = ParametricPlot[{2("0.690983") - Re[A5[[26]]], Im[A5[[26]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
bbb26 = ParametricPlot[{2("0.690983") - Re[A5[[26]]], -Im[A5[[26]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bbbb26 = ParametricPlot[{2("0.690983") - Re[A5[[26]]], -Im[A5[[26]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

c25 = ParametricPlot[{Re[A5[[25]]], Im[A5[[25]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cc25 = ParametricPlot[{Re[A5[[25]]], Im[A5[[25]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
ccc25 = ParametricPlot[{Re[A5[[25]]], -Im[A5[[25]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cccc25 = ParametricPlot[{Re[A5[[25]]], -Im[A5[[25]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
b25 = ParametricPlot[{2("0.690983") - Re[A5[[25]]], Im[A5[[25]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bbb25 = ParametricPlot[{2("0.690983") - Re[A5[[25]]], -Im[A5[[25]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bbbb25 = ParametricPlot[{2("0.690983") - Re[A5[[25]]], -Im[A5[[25]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

Show[Pic55, E1, c26, cc26, ccc26, cccc26, b26, bb26, bbb26, bbbb26, c25, cc25, ccc25, cccc25, b25, bb25, bbb25, bbbb25]
PlotRange → {{-4, 5}, {-4, 4}}

bb25 = ParametricPlot[{2("0.690983") - Re[A5[[25]]], Im[A5[[25]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

c29 = ParametricPlot[{Re[A5[[29]]], Im[A5[[29]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cc29 = ParametricPlot[{Re[A5[[29]]], Im[A5[[29]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
ccc29 = ParametricPlot[{Re[A5[[29]]], -Im[A5[[29]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cccc29 = ParametricPlot[{Re[A5[[29]]], -Im[A5[[29]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
b29 = ParametricPlot[{2("0.690983") - Re[A5[[29]]], Im[A5[[29]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bbb29 = ParametricPlot[{2("0.690983") - Re[A5[[29]]], -Im[A5[[29]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bbbb29 = ParametricPlot[{2("0.690983") - Re[A5[[29]]], -Im[A5[[29]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

```

```
bb29 = ParametricPlot[{2(“0.690983”) - Re[A5[[29]]], Im[A5[[29]]]}, {t, 0.0001, 30}, MaxRecursion -> 1]
Show[Pic55, E1, c29, ccc29, cccc29, b29, bb29, bbb29, bbbb29, PlotRange -> {{-4, 5}, {-4, 4}}]
```

```
c30 = ParametricPlot[{Re[A5[[30]]], Im[A5[[30]]]}, {t, -30, -0.0001}, MaxRecursion -> 1]
cc30 = ParametricPlot[{Re[A5[[30]]], Im[A5[[30]]]}, {t, 0.0001, 30}, MaxRecursion -> 1]
ccc30 = ParametricPlot[{Re[A5[[30]]], -Im[A5[[30]]]}, {t, -30, -0.0001}, MaxRecursion -> 1]
cccc30 = ParametricPlot[{Re[A5[[30]]], -Im[A5[[30]]]}, {t, 0.0001, 30}, MaxRecursion -> 1]
b30 = ParametricPlot[{2(“0.690983”) - Re[A5[[30]]], Im[A5[[30]]]}, {t, -30, -0.0001}, MaxRecursion -> 1]
bb30 = ParametricPlot[{2(“0.690983”) - Re[A5[[30]]], Im[A5[[30]]]}, {t, 0.0001, 30}, MaxRecursion -> 1]
bbb30 = ParametricPlot[{2(“0.690983”) - Re[A5[[30]]], -Im[A5[[30]]]}, {t, -30, -0.0001}, MaxRecursion -> 1]
bbbb30 = ParametricPlot[{2(“0.690983”) - Re[A5[[30]]], -Im[A5[[30]]]}, {t, 0.0001, 30}, MaxRecursion -> 1]
Show[Pic55, E1, c30, cc30, ccc30, cccc30, b30, bb30, bbb30, bbbb30, PlotRange -> {{-4, 5}, {-4, 4}}]
```

```
c40 = ParametricPlot[{Re[A5[[40]]], Im[A5[[40]]]}, {t, -30, -0.0001}, MaxRecursion -> 1]
cc40 = ParametricPlot[{Re[A5[[40]]], Im[A5[[40]]]}, {t, 0.0001, 30}, MaxRecursion -> 1]
ccc40 = ParametricPlot[{Re[A5[[40]]], -Im[A5[[40]]]}, {t, -30, -0.0001}, MaxRecursion -> 1]
cccc40 = ParametricPlot[{Re[A5[[40]]], -Im[A5[[40]]]}, {t, 0.0001, 30}, MaxRecursion -> 1]
b40 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[40]]], Im[A5[[40]]]}, {t, -30, -0.0001}, MaxRecursion -> 1]
bb40 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[40]]], Im[A5[[40]]]}, {t, 0.0001, 30}, MaxRecursion -> 1]
bbb40 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[40]]], -Im[A5[[40]]]}, {t, -30, -0.0001}, MaxRecursion -> 1]
bbbb40 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[40]]], -Im[A5[[40]]]}, {t, 0.0001, 30}, MaxRecursion -> 1]
Show[Pic55, E1, c40, cc40, ccc40, cccc40, b40, bb40, bbb40, bbbb40, PlotRange -> {{-4, 5}, {-4, 4}}]
```

```
c41 = ParametricPlot[{Re[A5[[41]]], Im[A5[[41]]]}, {t, -30, -0.0001}, MaxRecursion -> 1]
cc41 = ParametricPlot[{Re[A5[[41]]], Im[A5[[41]]]}, {t, 0.0001, 30}, MaxRecursion -> 1]
ccc41 = ParametricPlot[{Re[A5[[41]]], -Im[A5[[41]]]}, {t, -30, -0.0001}, MaxRecursion -> 1]
```

```

cccc41 = ParametricPlot[{Re[A5[[41]]], -Im[A5[[41]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
b41 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[41]]], Im[A5[[41]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bb41 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[41]]], Im[A5[[41]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
bbb41 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[41]]], -Im[A5[[41]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bbbb41 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[41]]], -Im[A5[[41]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
Show[Pic55, E1, c41, cc41, ccc41, cccc41, b41, bb41, bbb41, bbbb41, PlotRange → {{-4, 5}, {-4, 4}}]

```

```

c76 = ParametricPlot[{Re[A5[[76]]], Im[A5[[76]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cc76 = ParametricPlot[{Re[A5[[76]]], Im[A5[[76]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
ccc76 = ParametricPlot[{Re[A5[[76]]], -Im[A5[[76]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cccc76 = ParametricPlot[{Re[A5[[76]]], -Im[A5[[76]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
b76 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[76]]], Im[A5[[76]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bb76 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[76]]], Im[A5[[76]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
bbb76 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[76]]], -Im[A5[[76]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bbbb76 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[76]]], -Im[A5[[76]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
Show[Pic55, E1, c76, cc76, ccc76, cccc76, b76, bb76, bbb76, bbbb76, PlotRange → {{-4, 5}, {-4, 4}}]

```

```

c75 = ParametricPlot[{Re[A5[[75]]], Im[A5[[75]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cc75 = ParametricPlot[{Re[A5[[75]]], Im[A5[[75]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
ccc75 = ParametricPlot[{Re[A5[[75]]], -Im[A5[[75]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cccc75 = ParametricPlot[{Re[A5[[75]]], -Im[A5[[75]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
b75 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[75]]], Im[A5[[75]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bb75 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[75]]], Im[A5[[75]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
bbb75 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[75]]], -Im[A5[[75]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bbbb75 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[75]]], -Im[A5[[75]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
Show[Pic55, E1, c76, cc76, ccc76, cccc76, b76, bb76, bbb76, bbbb76, PlotRange → {{-4, 5}, {-4, 4}}]

Show[Pic55, E1, c75, cc75, ccc75, cccc75, b75, bb75, bbb75, bbbb75, PlotRange → {{-4, 5}, {-4, 4}}]

```



```

c82 = ParametricPlot[{Re[A5[[82]]], Im[A5[[82]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cc82 = ParametricPlot[{Re[A5[[82]]], Im[A5[[82]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
ccc82 = ParametricPlot[{Re[A5[[82]]], -Im[A5[[82]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cccc82 = ParametricPlot[{Re[A5[[82]]], -Im[A5[[82]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
b82 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[82]]], Im[A5[[82]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bb82 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[82]]], Im[A5[[82]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
bbb82 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[82]]], -Im[A5[[82]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bbbb82 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[82]]], -Im[A5[[82]]]}, {t, 0.0001, 30}, MaxRecursion → 1]

```

```

Show[Pic55, E1, c82, cc82, ccc82, cccc82, b82, bb82, bbb82, bbbb82, PlotRange → {{-4, 5}, {-4, 4}}]

```

```

c81 = ParametricPlot[{Re[A5[[81]]], Im[A5[[81]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cc81 = ParametricPlot[{Re[A5[[81]]], Im[A5[[81]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
ccc81 = ParametricPlot[{Re[A5[[81]]], -Im[A5[[81]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cccc81 = ParametricPlot[{Re[A5[[81]]], -Im[A5[[81]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
b81 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[81]]], Im[A5[[81]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bb81 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[81]]], Im[A5[[81]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
bbb81 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[81]]], -Im[A5[[81]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
bbbb81 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[81]]], -Im[A5[[81]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
Show[Pic55, E1, c81, cc81, ccc81, cccc81, b81, bb81, bbb81, bbbb81, PlotRange → {{-4, 5}, {-4, 4}}]

```

```

c106 = ParametricPlot[{Re[A5[[106]]], Im[A5[[106]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cc106 = ParametricPlot[{Re[A5[[106]]], Im[A5[[106]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
ccc106 = ParametricPlot[{Re[A5[[106]]], -Im[A5[[106]]]}, {t, -30, -0.0001}, MaxRecursion → 1]
cccc106 = ParametricPlot[{Re[A5[[106]]], -Im[A5[[106]]]}, {t, 0.0001, 30}, MaxRecursion → 1]
b106 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[106]]], Im[A5[[106]]]}, {t, -30, -0.0001}, MaxRecursion → 1]

```

```

bb106 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[106]]], Im[A5[[106]]]}, {t, 0.0001, 30}, MaxRecursion
bbb106 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[106]]], -Im[A5[[106]]]}, {t, -30, -0.0001}, MaxRec
bbbb106 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[106]]], -Im[A5[[106]]]}, {t, 0.0001, 30}, MaxRecu

```

```

Show[Pic55, E1, c106, cc106, ccc106, cccc106, b106, bb106, bbb106, bbbb106, c106, cc107, ccc107, cccc107, b107, b
bbbb107, PlotRange -> {{-4, 5}, {-4, 4}}]

```

```

c107 = ParametricPlot[{Re[A5[[107]]], Im[A5[[107]]]}, {t, -30, -0.0001}, MaxRecursion -> 1]
cc107 = ParametricPlot[{Re[A5[[107]]], Im[A5[[107]]]}, {t, 0.0001, 30}, MaxRecursion -> 1]
ccc107 = ParametricPlot[{Re[A5[[107]]], -Im[A5[[107]]]}, {t, -30, -0.0001}, MaxRecursion -> 1]
cccc107 = ParametricPlot[{Re[A5[[107]]], -Im[A5[[107]]]}, {t, 0.0001, 30}, MaxRecursion -> 1]
b107 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[107]]], Im[A5[[107]]]}, {t, -30, -0.0001}, MaxRecursi
bb107 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[107]]], Im[A5[[107]]]}, {t, 0.0001, 30}, MaxRecursion
bbb107 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[107]]], -Im[A5[[107]]]}, {t, -30, -0.0001}, MaxRec
bbbb107 = ParametricPlot[{2(0.6909830056250525) - Re[A5[[107]]], -Im[A5[[107]]]}, {t, 0.0001, 30}, MaxRecu

```

Greenpoints are (5, 5) cases.

$1.64369 + 1.82775i, -2.61803, -.310577 + 1.60586i, -3.61803, -1.76538 + 1.5693i, -1.19098 + 0.981593i, -2.61803 - 2 + .786151i, -.190983 + 0.981593i, -1.19098 + 1.8925i$

Yellowpoints are (5, 2) cases.

$H = \{1.64369 + 1.82775i, -2.61803, -.310577 + 1.60586i, -3.61803, -1.76538 + 1.5693i, -1.19098 + 0.981593i, -1, -2 + .786151i, -.190983 + 0.981593i, -1.19098 + 1.8925i\};$

$HH = \text{Table}[\text{Solve}[\text{Gamma}(\text{Gamma} - 4\sin[\frac{\pi}{5}]\sin[\frac{\pi}{5}]) == H[[i]], \text{Gamma}], \{i, 1, \text{Length}[H]\}]$

$HHH = \text{Flatten}[\text{Gamma}/.HH]$

$W = \text{ListPlot}[\text{ReIm}[HHH], \text{PlotStyle} \rightarrow \text{Green}, \text{PlotRange} \rightarrow \{\{-4, 5\}, \{-4, 4\}\}]$

Pic88 =