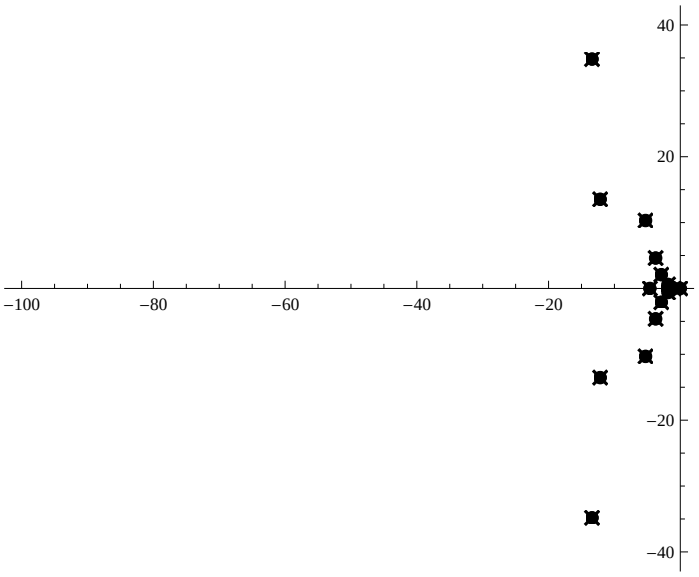
```
dh[n_, k_, a_] := dh[n, k, a] =
  Sum[Binomial[k, j] dh[Floor[n / (m^(k - j))], j, m + 1], {m, a, n^(1 / k)}, {j, 0, k - 1}]
dh[n_, 1, a_] := Floor[n] - a + 1
dh[n_, 0, a_] := 1
bn[z_, a_] := bn[z, a] = Product[(z - k), {k, 0, a - 1}] / a!
dd[n_, z_] := Sum[bn[z, a] dh[n, a, 2], {a, 0, Log[2, n]}]
zeros[n_] := List @@ NRoots[dd[n, z] == 0, z][[All, 2]]
zeros2[n_] := List @@ Roots[dd[n, z] == 0, z][[All, 2]]
Dp[n_, z_] := Product[1 - z / k, {k, zeros[n]}]
```

```
-1 / zeros[1 000 000]
```

```
{0.000884021, 0.00838263, 0.00558543 - 0.010194 i, 0.00558543 + 0.010194 i,
 0.00962442 - 0.025014 i, 0.00962442 + 0.025014 i, 0.036726 - 0.0408746 i,
 0.036726 + 0.0408746 i, 0.0393032 - 0.0768611 i, 0.0393032 + 0.0768611 i,
 0.216669, 0.105991 - 0.130723 i, 0.105991 + 0.130723 i, 0.227509 - 0.164963 i,
 0.227509 + 0.164963 i, 0.483724 - 0.159633 i, 0.483724 + 0.159633 i, 1.02788, 78 594.}
```

```
RootLocusPlot[1 / dd[1 000 000, z], {k, 0, 1}]
```




```
zeros[30]
```

```
{-16.1801, -1.66598 - 0.772391 i, -1.66598 + 0.772391 i, -0.0879758}
```

```
pts = Table[(Point[{Re[#], Im[#]}]) & /@ zeros[n], {n, 5, 300}]
```

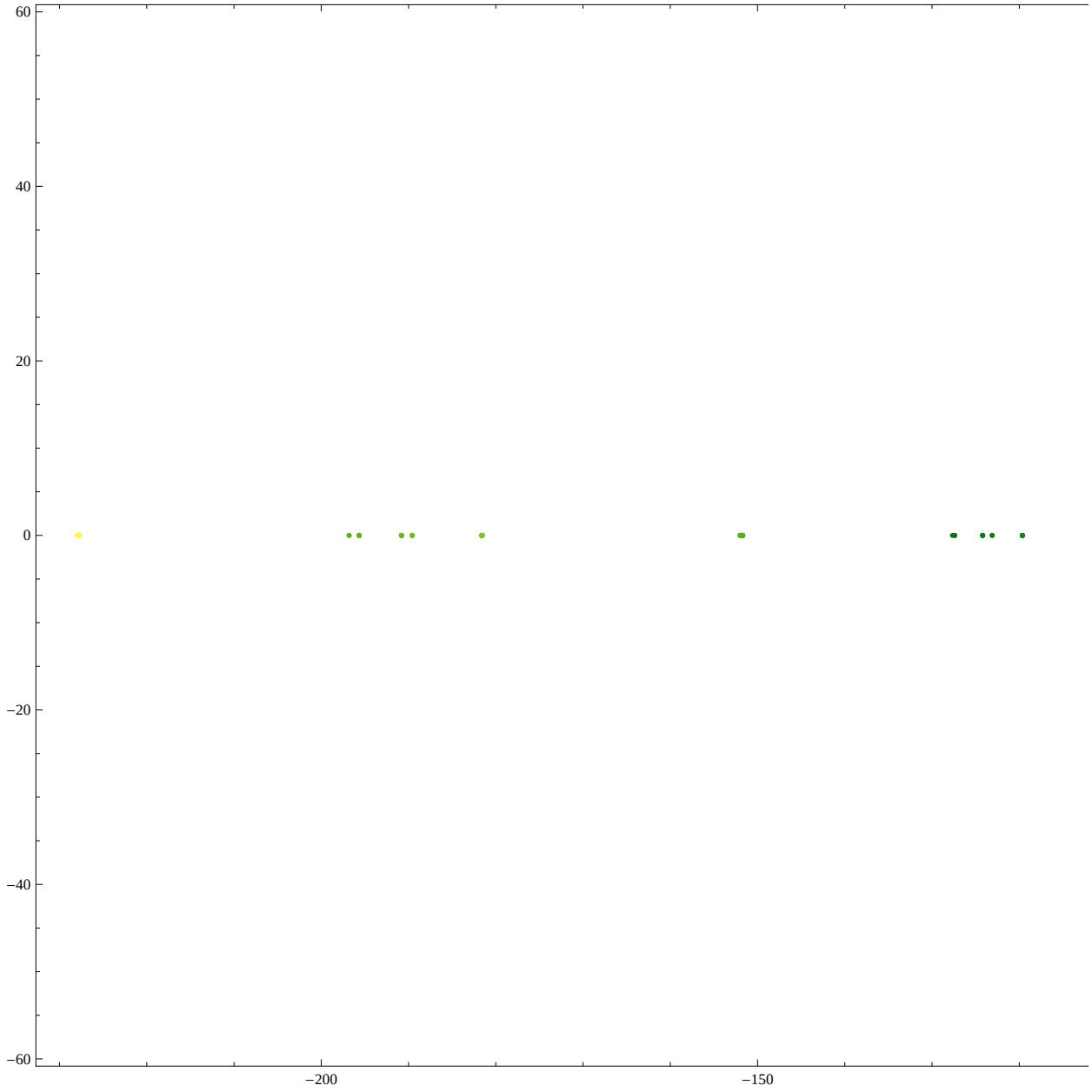
A very large output was generated. Here is a sample of it:

```
{{Point[{-6.70156, 0}]}, Point[{-0.298438, 0}]}},
 {Point[{-2., 0}]}, Point[{-0.333333, 0}]}}, <<293>>,
 {Point[{-227.957, 0}]}, Point[{-11.4284, -14.0739}]}, Point[{-11.4284, 14.0739}]},
  Point[{-3.3017, -3.02411}]}, Point[{-3.3017, 3.02411}]},
  Point[{-1.28385, -0.350654}]}, Point[{-1.28385, 0.350654}]}, Point[{-0.0151558, 0}]}}}
```

Show Less | Show More | Show Full Output | Set Size Limit...

```
Show[Graphics[pts], Frame → True]
```

```
colfunc = ColorData["AvocadoColors"];
pts = Table[{colfunc[n / 300], Point[{Re[#], Im[#]}]} & /@ zeros[n], {n, 5, 300}];
Graphics[pts, Frame → True]
```



```
Table[(pt[{Re[#], Im[#]}]) & /@ zeros[n], {n, 5, 300}]
```

A very large output was generated. Here is a sample of it:

```
{{pt[{-6.70156, 0}], pt[{-0.298438, 0}]}, {pt[{-2., 0}], pt[{-0.333333, 0}]},
 <<293>>, {pt[{-227.957, 0}], pt[{-11.4284, -14.0739}],
  pt[{-11.4284, 14.0739}], pt[{-3.3017, -3.02411}], pt[{-3.3017, 3.02411}],
  pt[{-1.28385, -0.350654}], pt[{-1.28385, 0.350654}], pt[{-0.0151558, 0}]}}
```

Show Less | Show More | Show Full Output | Set Size Limit...

```
Export["tabletest", Table[(pt[{Re[#], Im[#]}]) & /@ zeros[n], {n, 5, 300}], "Table"]
```

```
tabletest
```

```
Export["tabletest2", Table[(pt[{Re[#], Im[#]}]) & /@ zeros[n], {n, 5, 100 000}], "Table"]
```

NRoots::nnumeq : False is expected to be a polynomial equation in the variable z with numeric coefficients. ≫

Part::partd : Part specification NRoots[False, z][[All, 2]] is longer than depth of object. ≫

Part::partd : Part specification (z == −1.)[[All, 2]] is longer than depth of object. ≫

Part::partd : Part specification (z == −0.5)[[All, 2]] is longer than depth of object. ≫

General::stop : Further output of Part::partd will be suppressed during this calculation. ≫

```
$Aborted
```

```
Export["tabletest2", Table[(pt[{Re[#], Im[#]}]) & /@ zeros[n], {n, 5, 100 000}], "Table"]
```

```
tabletest2
```

```
colfunc = ColorData["AvocadoColors"]; aa = 1000; bb = 1000;
pts = Table[{colfunc[(n - aa) / bb], Point[{Re[#], Im[#]}]} & /@ zeros[n], {n, aa, aa + bb}];
Graphics[pts, Frame → True, PlotRange → {{-60, 0}, {-20, 20}}]
```