```
K[n_] := K[n] = If[n == 1, 0, FullSimplify[MangoldtLambda[n] / Log[n]]]
P[n_, k_] := P[n, k] = Sum[ K[j] P[Floor[n / j], k - 1], {j, 2, n}]; P[n_, 0] := 1
dd[n_, z_] := dd[n, z] = Sum[ z^(k - 1) / k! P[n, k], {k, 1, Log[2, n]}]
zeros[n_] := zeros[n] = List @@ NRoots[ dd[n, z] == 0, z][[All, 2]]
pr[n_] := (n - 1) Product[ 1 + 1 / (r - 1), {r, zeros[n]}]
dp[n_, z_] := 1 + z (n - 1) Product[ 1 - (z - 1) / (r - 1), {r, zeros[n]}]
```

```
1 + 1 / (zeros[200] - 1)
```

```
{0.975077 + 0.0307408 i, 0.975077 - 0.0307408 i, 0.864483 + 0.0935502 i,
 0.864483 - 0.0935502 i, 0.584202 + 0.122186 i, 0.584202 - 0.122186 i}
```

```
pr[100]
```

```
28.5333 + 0. i
```

```
1 - 1 / (zeros[200] - 1)
```

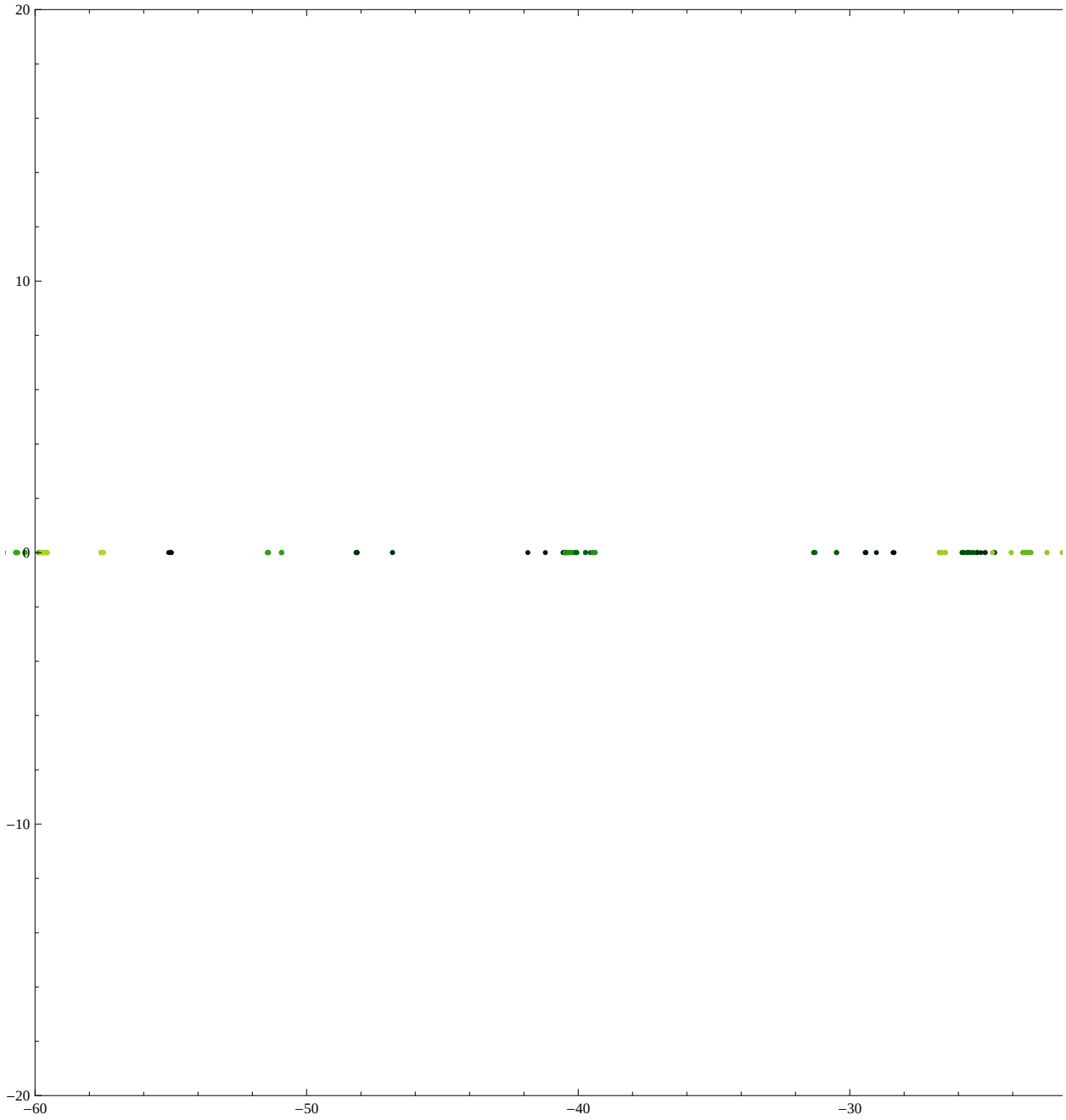
```
{1.02492 - 0.0307408 i, 1.02492 + 0.0307408 i, 1.13552 - 0.0935502 i,
 1.13552 + 0.0935502 i, 1.4158 - 0.122186 i, 1.4158 + 0.122186 i}
```

```
1 + 2 / (zeros[200] - 1)
```

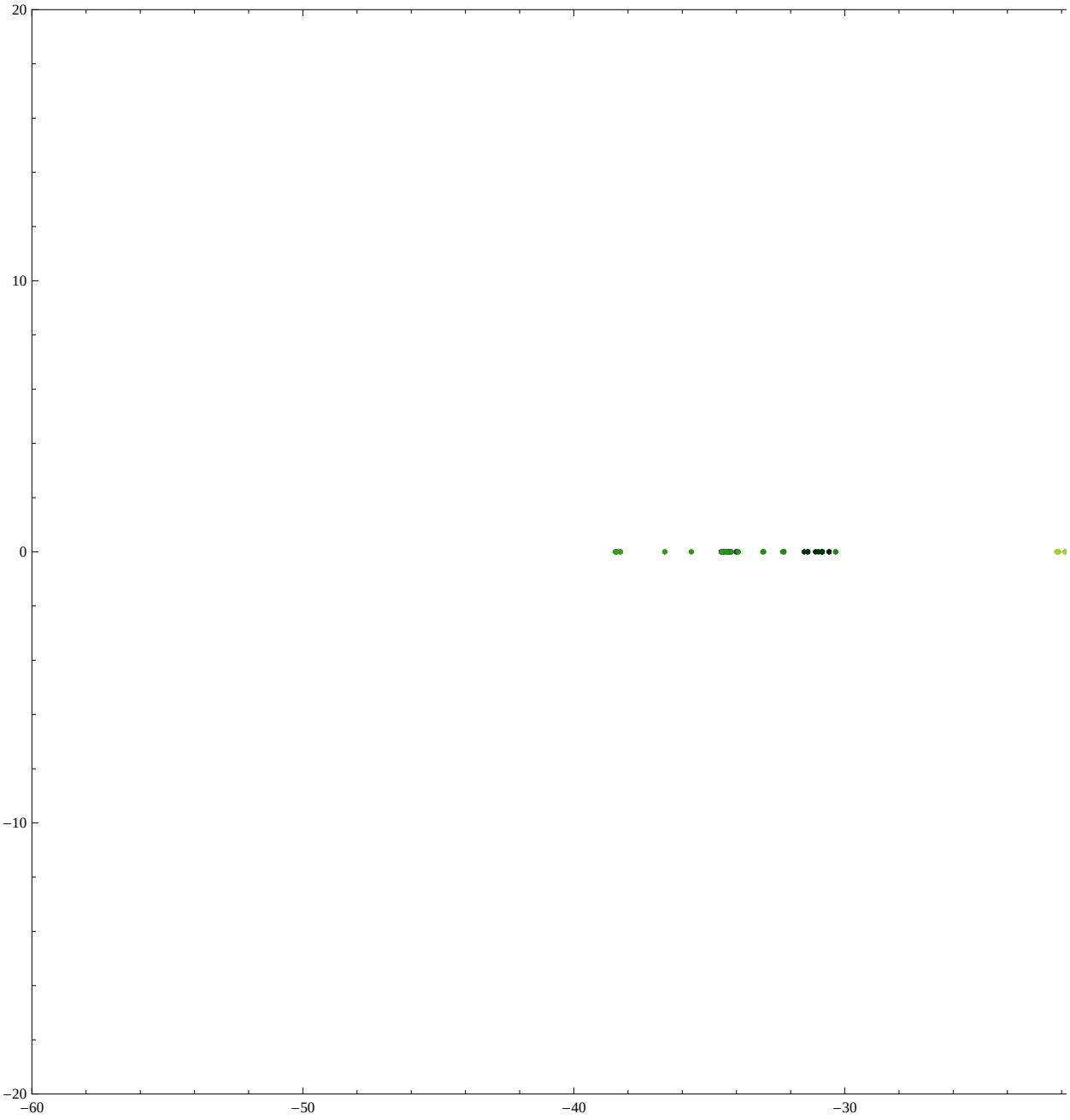
```
{0.950154 + 0.0614815 i, 0.950154 - 0.0614815 i, 0.728966 + 0.1871 i,
 0.728966 - 0.1871 i, 0.168404 + 0.244372 i, 0.168404 - 0.244372 i}
```

```
pts = Table[(Point[{Re[#], Im[#]}]) & /@ zeros[n], {n, 10, 300}]
```

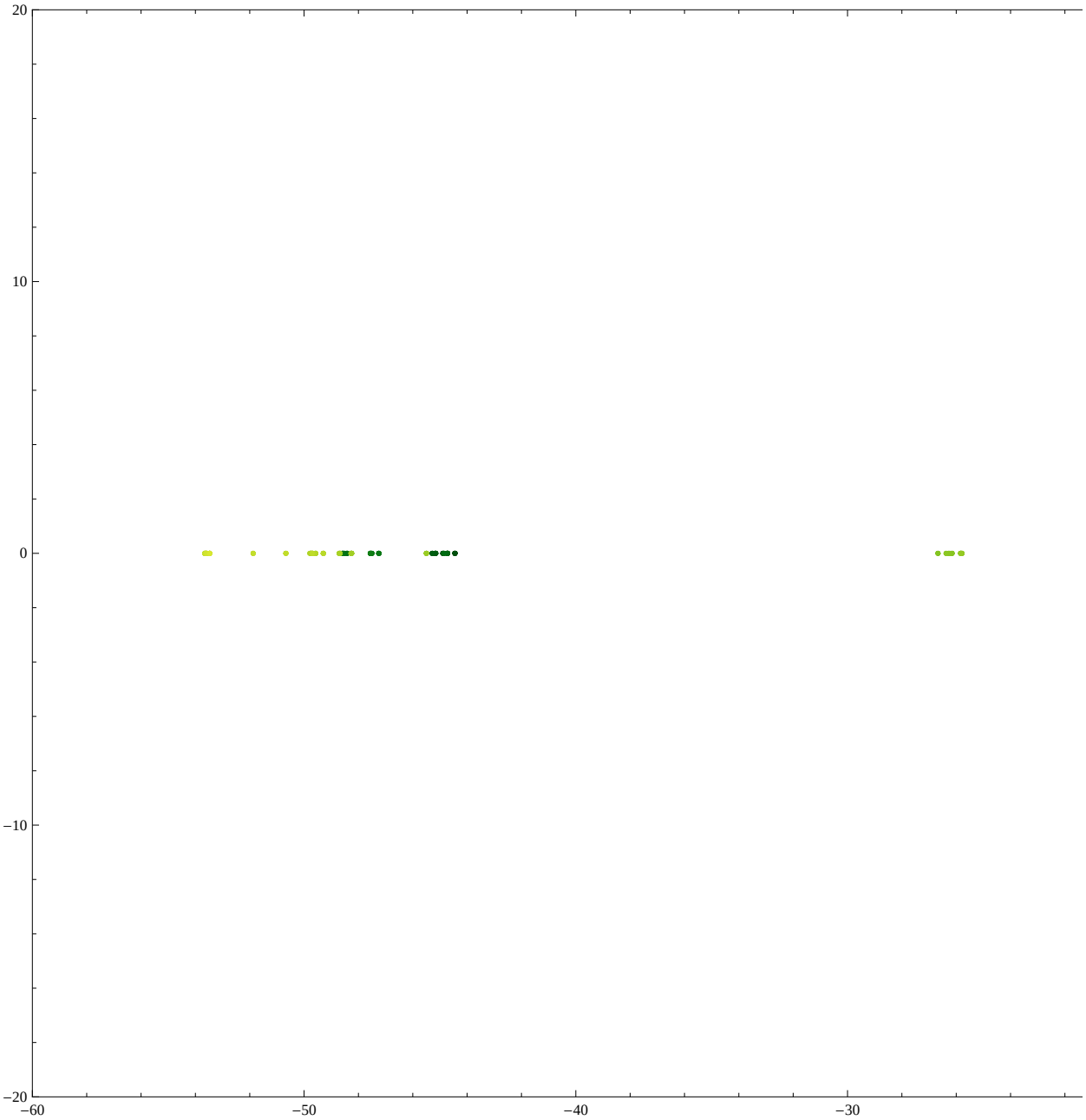
```
colfunc = ColorData["AvocadoColors"]; aa = 10; bb = 1000;
pts1 = Table[{colfunc[(n - aa) / bb], Point[{Re[#], Im[#]}]} & /@ zeros[n], {n, aa, aa + bb}];
Graphics[pts1, Frame → True, PlotRange → {{-60, 0}, {-20, 20}}]
```



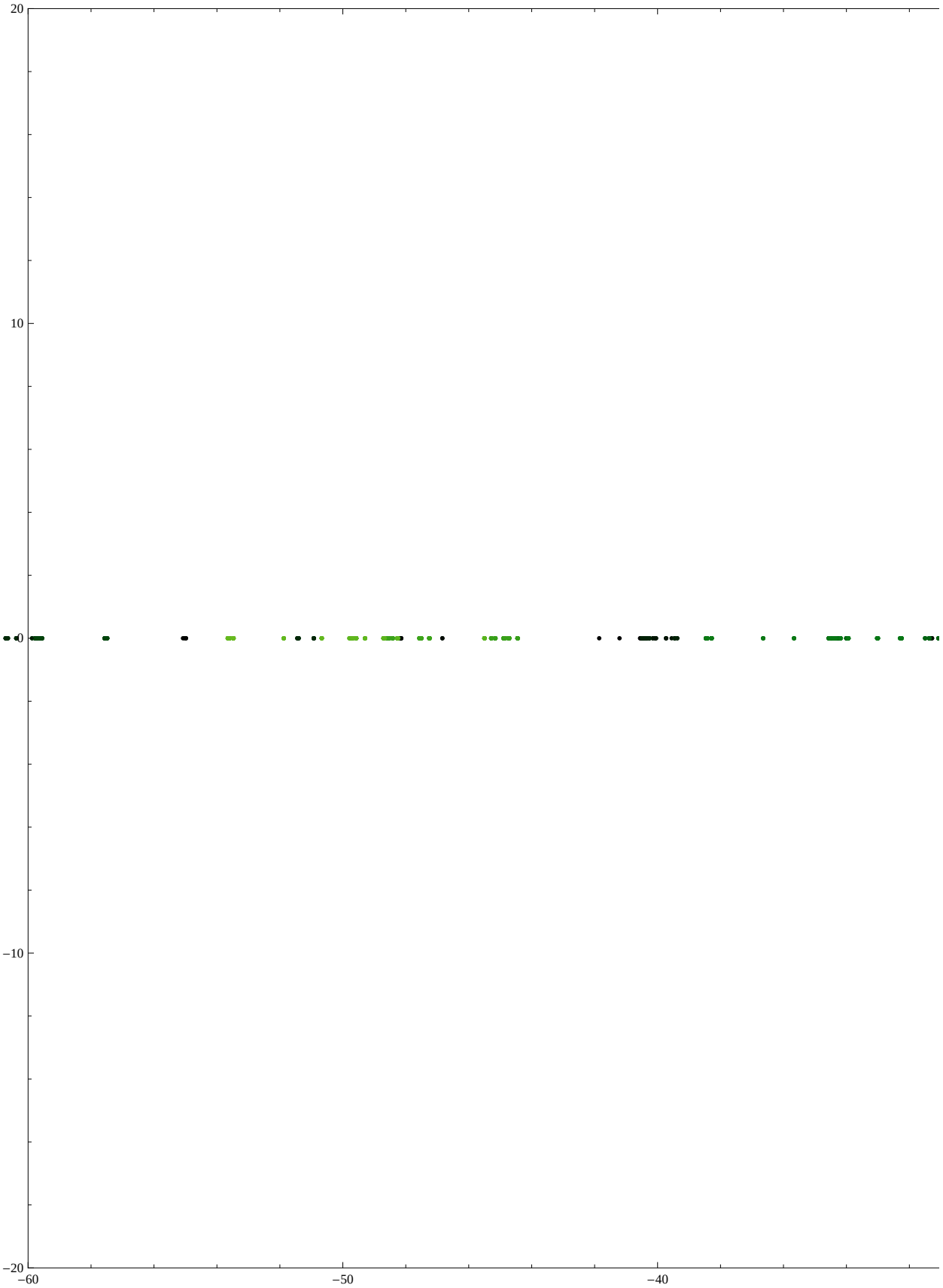
```
colfunc = ColorData["AvocadoColors"]; aa = 1000; bb = 1000;
pts = Table[{colfunc[(n - aa) / bb], Point[{Re[#], Im[#]}]} & /@ zeros[n], {n, aa, aa + bb}];
Graphics[pts, Frame → True, PlotRange → {{-60, 0}, {-20, 20}}]
```



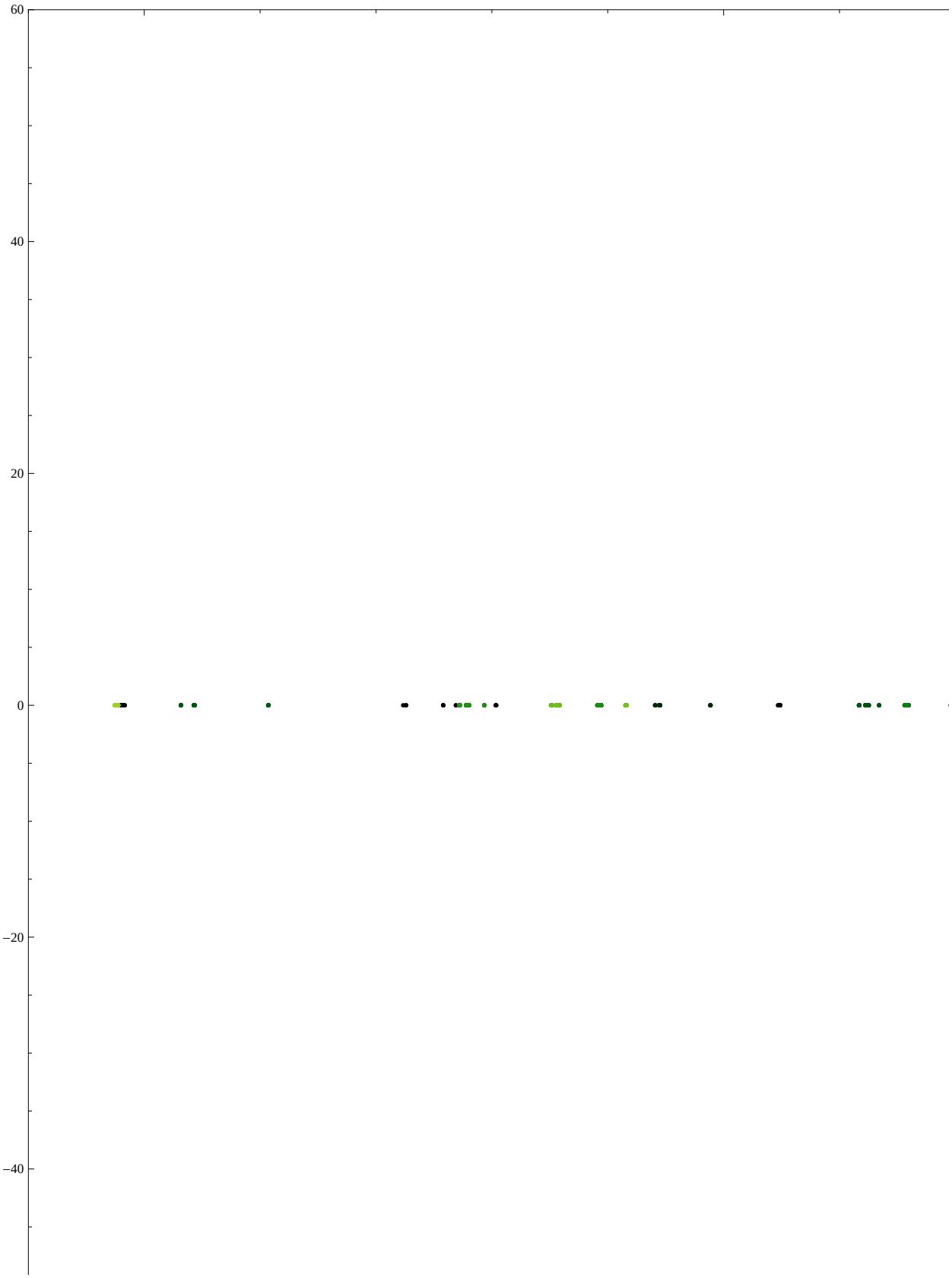
```
colfunc = ColorData["AvocadoColors"]; aa = 2000; bb = 1000;
pts2 = Table[{colfunc[(n - aa) / bb], Point[{Re[#], Im[#]}]} & /@ zeros[n], {n, aa, aa + bb}];
Graphics[pts2, Frame → True, PlotRange → {{-60, 0}, {-20, 20}}]
```

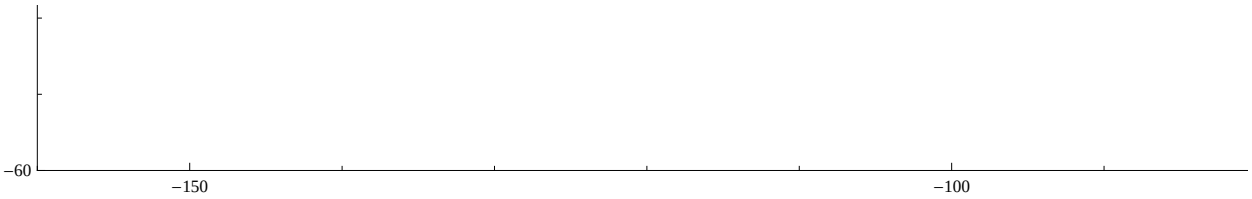



```
colfunc = ColorData["AvocadoColors"]; aa = 10; bb = 5000;
pts4 = Table[{colfunc[(n - aa) / bb], Point[{Re[#], Im[#]}]} & /@ zeros[n], {n, aa, aa + bb}];
Graphics[pts4, Frame → True, PlotRange → {{-60, 0}, {-20, 20}}]
```


20
10
0
−10
−20
−60
−50
−40

```
Graphics[pts4, Frame → True, PlotRange → {{-160, 0}, {-60, 60}}]
```




−60
−150
−100