

## Analytic Combinatorics Program IV.2

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Let  $f(z) \ln\left(\frac{1}{1-\ln\frac{1}{1-z}}\right)$  be the generating function for supernecklaces. We have

$$f'(z) = \left(1 - \ln \frac{1}{1-z}\right) \cdot \frac{(1-z)\frac{1}{(1-z)^2}}{\left(1 - \ln \frac{1}{1-z}\right)^2} = \frac{1}{(1-z)\left(1 - \ln \frac{1}{1-z}\right)} = \frac{1}{(1-z)(1 + \ln(1-z))}.$$

I adapted the example code for this function:

```
public class Supernecklace_Plot implements ComplexFunction {
    public Complex eval(Complex z) {
        Complex one = new Complex(1, 0);
        Complex oneMinusZ = one.minus(z);
        Complex onePlusLogOneMinusZ = one.plus(oneMinusZ.log());
        Complex product = oneMinusZ.times(onePlusLogOneMinusZ);
        return product.reciprocal();
    }

    public static void main(String[] args) {
        Plot2Dez.show(new Supernecklace_Plot(), 512);
    }
}
```

This produced the following plot:

