# crystal/forest fractal

An example from the book "Fractals - Endlessly repeated geometric figures", by Hans Lauwerier, page 94.

```
> restart:
> Digits:=4:
> with(plots):
Warning, the name changecoords has been redefined

>
> AFFINE1:=proc(X,a,b,c,d,e,f)
    RETURN(evalf([a*X[1]+b*X[2]+e,
                  c*X[1]+d*X[2]+f]));
    end:
> f1:=P->AFFINE1(P,0,-.7,.7,0,0,0);
        #rotate by Pi/2 rads, and scale by .7
  f2:=P->AFFINE1(P,.7,0,0,.7,1,0);
        #just scale by factor of .7, and translate
        #to the right by 1
```

$$f1 := P \rightarrow \text{AFFINE1}(P, 0, -.7, .7, 0, 0, 0)$$

$$f2 := P \rightarrow \text{AFFINE1}(P, .7, 0, 0, .7, 1, 0)$$

```
> S:={[0,0]};
```

$$S := \{[0, 0]\}$$

```
> for i from 1 to 12 do
  S1:=map(f1,S);
  S2:=map(f2,S);
  S:=`union`(S1,S2);
  od:
> pointplot(S,symbol=point,scaling=constrained,
    title=`Figure 1.5, page 94 book by Lauwerier`);
>
```
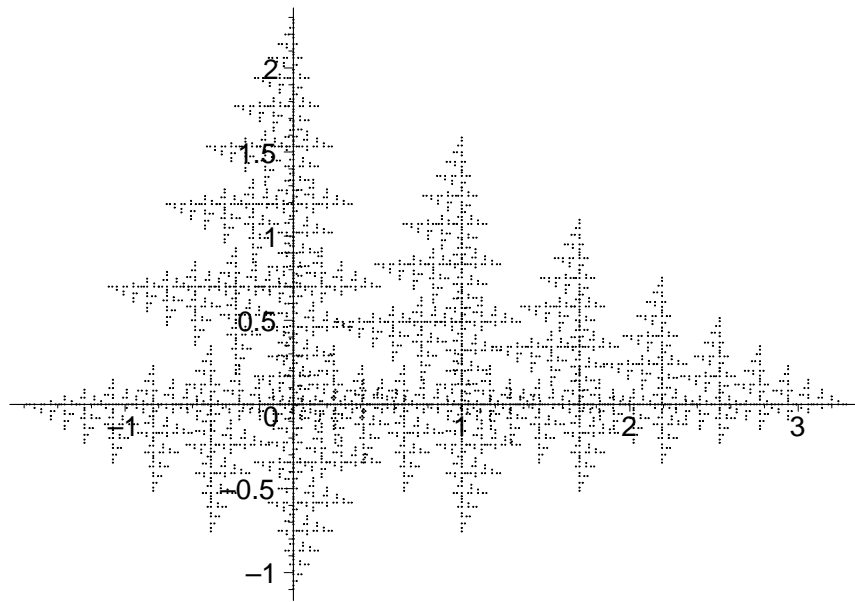
If you use the menu items to change the symbol from "point" to "circle", the picture kind of looks like a forest of pine trees instead of a patttern of frozen ice on a window.