

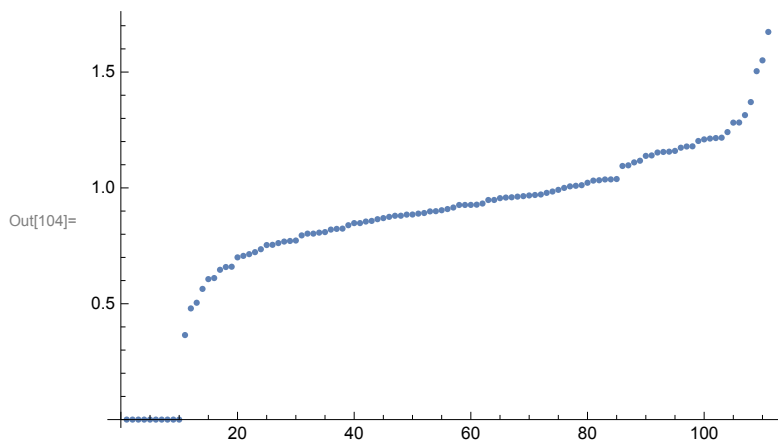
```
In[99]:= numstock = 100;  
numindustry = 10;
```

```
In[101]:= stkind = Join[  
  Join[Sort@RandomInteger[{1, numindustry}, numstock], Range[numindustry + 1]]];
```

```
In[102]:= stkbeta = Join[RandomVariate[NormalDistribution[1, 0.25], numstock],  
  Table[0, {numindustry}], {1}];
```

```
In[103]:= stkindbeta = Join[RandomVariate[NormalDistribution[1, 0.25], numstock],  
  Table[1, {numindustry}], {0}];
```

```
In[104]:= ListPlot[Sort[stkbeta]]
```



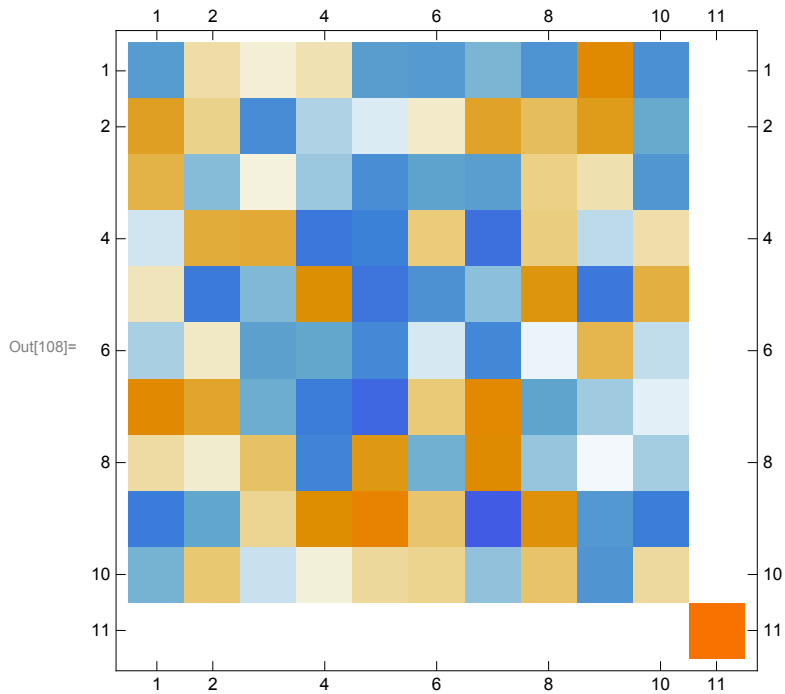
```
In[105]:= mktvar = 16 / 100. / Sqrt[252.]
```

Out[105]= 0.0100791

```
In[106]:= indvar = Join[Abs@  
  RandomVariate[NormalDistribution[mktvar / 2, mktvar / 4], numstock], {mktvar}];
```

```
In[107]:= indcov = Table[If[i ≤ numindustry && j ≤ numindustry,  
  Sqrt[indvar[[i]] * indvar[[j]]] * RandomReal[{-1, 1}],  
  Boole[i == j] * mktvar],  
  {i, numindustry + 1}, {j, numindustry + 1}];
```

```
In[108]:= indcov // MatrixPlot
```



```
In[109]:=
```

```
In[110]:= idiovar =
```

```
  Join[Abs@RandomVariate[NormalDistribution[mktvar/2, mktvar/4], numstock],
    Table[0, {numindustry}], {0}];
```

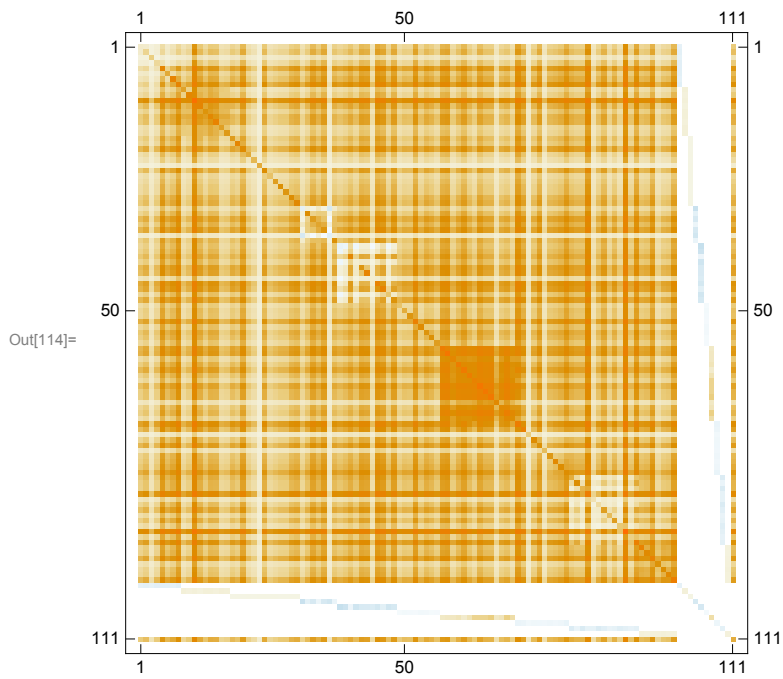
```
In[111]:=  $\Sigma = \text{Transpose}[\{\text{stkbeta}\}] \cdot \{\text{stkbeta} * \text{mktvar}\};$ 
```

```
In[112]:=  $\Sigma = \text{Table}[\text{stkbeta}[[i]] * \text{stkbeta}[[j]] * \text{mktvar} + \text{Boole}[i == j] * \text{idiovar}[[i]],$ 
  {i, numstock}, {j, numstock}];
```

```
In[113]:=  $\Sigma = \text{Table}[$ 
```

```
  stkbeta[[i]] * stkbeta[[j]] * mktvar +
  Boole[stkind[[i]] == stkind[[j]]] * stkindbeta[[i]] *
  stkindbeta[[j]] * incov[[stkind[[i]], stkind[[j]]]] +
  Boole[i == j] * idiovar[[i]],
  {i, numstock + numindustry + 1}, {j, numstock + numindustry + 1}];
```

```
In[114]:=  $\Sigma$  // MatrixPlot
```



```
In[115]:= Inverse[ $\Sigma$ ] // MatrixPlot
```

