

## Ex2/A2.cpp

```
1  #include <stdio.h>
2  #include "HermiteBandMatrix.h"
3  #include <complex>
4  #include "SCvector.h"
5
6  int main()
7  {
8      int n = 10;
9      int b = 4;
10
11     // Unit-Test
12     n = 6;
13     b = 3;
14     SC::HermiteBandMatrix<std::complex<double>> A(n, b);
15
16     // Set diagonal
17     for (int i = 0; i < n; i++)
18     {
19         A.Set(i, i, std::complex<double>(i + 1, 0));
20     }
21     A.Set(0, 1, std::complex<double>(2, 3));
22     A.Set(0, 2, std::complex<double>(1, 1));
23     A.Set(1, 2, std::complex<double>(1.4, 0));
24     A.Set(1, 3, std::complex<double>(0, 3));
25     A.Set(2, 3, std::complex<double>(1, -1));
26     A.Set(2, 4, std::complex<double>(0, 2));
27     A.Set(3, 4, std::complex<double>(1, 0));
28     A.Set(3, 5, std::complex<double>(1, 0));
29     A.Set(4, 5, std::complex<double>(1, -2));
30
31     A.Print(std::cout);
32
33     SC::Vector<std::complex<double>> x(n);
34     SC::Vector<std::complex<double>> r(n);
35
36     x(0) = std::complex<double>(1, 0);
37     x(1) = std::complex<double>(0, 1);
38     x(2) = std::complex<double>(-1, 0);
39     x(3) = std::complex<double>(0, -1);
40     x(4) = std::complex<double>(1, 0);
41     x(5) = std::complex<double>(0, 1);
42
43     A.Apply(x, r);
44     r.Print(std::cout);
45     std::cout << "\n";
46     A.ApplyT(x, r);
47     r.Print(std::cout);
48     std::cout << "\n";
49     A.ApplyH(x, r);
50     r.Print(std::cout);
51     std::cout << "\n";
52 }
```