```
n = 10;
Timing[dl = Table[i, {i, n - 1}];][[1]]
Timing[du = N[ 1 / dl];][[1]]
Timing[d =  N[Table[(-i + 2 n) ^ 2 / n, {i, n}]];][[1]]
Timing[b = N[Table[i - n / 2 + 1, {i, n}]];][[1]]
dl = -1.01; du = -1.0; d = 2.1; b = Table[1.0, {i, n}];
Timing[
  m = SparseArray[{Band[{1, 2}] → du, Band[{1, 1}] → d, Band[{2, 1}] → dl}, n];][[1]]
m // MatrixForm
b // MatrixForm
Timing[LinearSolve[m, b]][[1 ;; 2]]
```

```
0.
```

```
0.
```

```
0.
```

```
0.
```

```
0.
```

$$\begin{pmatrix} 2.1 & -1. & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -1.01 & 2.1 & -1. & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1.01 & 2.1 & -1. & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -1.01 & 2.1 & -1. & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1.01 & 2.1 & -1. & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -1.01 & 2.1 & -1. & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1.01 & 2.1 & -1. & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -1.01 & 2.1 & -1. & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1.01 & 2.1 & -1. \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1.01 & 2.1 \end{pmatrix}$$

$$\begin{pmatrix} 1. \\ 1. \\ 1. \\ 1. \\ 1. \\ 1. \\ 1. \\ 1. \\ 1. \\ 1. \end{pmatrix}$$

```
{0.,
 {2.59225, 4.44372, 5.71364, 6.51049, 6.90125, 6.91703, 6.5555, 5.78035, 4.51769, 2.64898}}
```

```
Inverse[m] // MatrixForm
```

0.737623	0.543573	0.399882	0.293246	0.213797	0.154185	0.108903	0.0737738	0.0455662
0.549009	1.1415	0.839752	0.615816	0.448973	0.323789	0.228697	0.154925	0.095689
0.407919	0.848149	1.3596	0.997036	0.726908	0.52423	0.370271	0.250831	0.154925
0.302131	0.628194	1.00701	1.4718	1.07305	0.773855	0.546585	0.370271	0.228697
0.222478	0.462577	0.741519	1.08378	1.51922	1.09562	0.773855	0.52423	0.323789
0.16205	0.336936	0.540114	0.78941	1.10658	1.51922	1.07305	0.726908	0.448973
0.115603	0.240363	0.385305	0.563147	0.78941	1.08378	1.4718	0.997036	0.615816
0.0790955	0.164456	0.263626	0.385305	0.540114	0.741519	1.00701	1.3596	0.839752
0.0493417	0.102592	0.164456	0.240363	0.336936	0.462577	0.628194	0.848149	1.1415
0.023731	0.0493417	0.0790955	0.115603	0.16205	0.222478	0.302131	0.407919	0.549009

0.939251	0.869804	0.792432	0.707981	0.617356	0.521516	0.421462	0.318225	0.212859	0.10
0.878502	1.73961	1.58486	1.41596	1.23471	1.04303	0.842923	0.63645	0.425719	0.21
0.80836	1.60071	2.36937	2.11686	1.8459	1.55933	1.26017	0.951492	0.63645	0.31
0.729434	1.44442	2.13803	2.80361	2.44473	2.0652	1.66899	1.26017	0.842923	0.42
0.642423	1.27213	1.883	2.46918	3.02511	2.55548	2.0652	1.55933	1.04303	0.52
0.548119	1.08538	1.60658	2.10672	2.58104	3.02511	2.44473	1.8459	1.23471	0.61
0.44739	0.885921	1.31134	1.71956	2.10672	2.46918	2.80361	2.11686	1.41596	0.70
0.34118	0.675604	1.00003	1.31134	1.60658	1.883	2.13803	2.36937	1.58486	0.79
0.230496	0.456428	0.675604	0.885921	1.08538	1.27213	1.44442	1.60071	1.73961	0.86
0.116401	0.230496	0.34118	0.44739	0.548119	0.642423	0.729434	0.80836	0.878502	0.93

```
{0., {5., 9., 12., 14., 15., 15., 14., 12., 9., 5.}}
```

```
q = -0.2 Table[-i^2, {i, n}]; z = q;
```

```
d = m.z - q - z;
M = m;
For[i = 1, i ≤ n, i++,
 If[d[[i]] ≥ 0,
   For[k = 1,  k ≤ n, k++,
    M[[i, k]] = KroneckerDelta[i, k];
   ];
   q[[i]] = 0
  ];
]
LinearSolve[M, q]
```

```
{22., 43.8, 64.8, 84., 100., 111., 114.8, 108.8, 90., 55.}
```