Q6 Solve test

Q6.1 Solve the system using the Jacobi method

Jacobi Banded with Residual Stopping Criteria

Solution vector x:

212.333

424.667

636

843.333

1041.67

1224

1381.33

1502.67

1575

1583.33

1510.67

1338

1044.33

606.667

Iterations: 861

Jacobi Banded with Consecutive Stopping Criteria

Solution vector x:

212.333

424.667

636

843.333

1041.67

1224

1381.33

1502.67

1575

1583.33

1510.67

1338

1044.33

606.667

Iterations: 830

Q6.2 Solve the system using the GS method

Gauss-Seidel Banded with Residual Stopping Criteria

Solution vector x:

212.333

424.667

636

843.333

1041.67

1224

1381.33

1502.67

1575

1583.33

1510.67

1338

1044.33

606.667

Iterations: 432

Gauss-Seidel Banded with Consecutive Stopping Criteria

Solution vector x:

212.333

424.667

636

843.333

1041.67

1224

1381.33

1502.67

1575

1583.33

1510.67

1338

1044.33

606.667

Iterations: 432

Q6.3 Solve the system using the SOR method

SOR Banded with Residual Stopping Criteria and omega = 1.15

Solution vector x:

212.333

424.667

636

843.333

1041.67

1224

1381.33

1502.67

1575

1583.33

1510.67

1338

1044.33

606.667

Iterations: 317

SOR Banded with Consecutive Stopping Criteria and omega = 1.15

Solution vector x:

212.333

424.667

636

843.333

1041.67

1224

1381.33

1502.67

1575

1583.33

1510.67

1338

1044.33

606.667

Iterations: 322

Q6.4 The SOR method results for different omega's

SOR Banded with Residual Stopping Criteria and omega = 1.02

Solution vector x:

212.333

424.667

636

843.333

1041.67

1224

1381.33

1502.67

1575

1583.33

1510.67

1338

1044.33

606.667

Iterations: 415

SOR Banded with Residual Stopping Criteria and omega = 0.02

Solution vector x:

212.333

424.667

636

843.333

1041.67

1224

1381.33

1502.67

1575

1583.33

1510.67

1338

1044.33

606.667

Iterations: 43099

SOR Banded with Residual Stopping Criteria and omega = 1.98

Solution vector x:

212.333

424.667

636

843.333

1041.67

1224

1381.33

1502.67

1575

1583.33

1510.67

1338

1044.33

606.667

Iterations: 989

Comment:

// 1. The residual-based and consecutive approximation stopping conditions result in identical solution and quite similar

// convergence speed.

// 2. Compare the convergence speed of the Jacobi method, the GS method and the SOR method:

// SOR with a good choice of omega > GS > Jacobi > SOR with a bad choice of omega

// 3. For the SOR method, when omega is near to 0 or 2, the convergence speed is rather low compared to the omega close to 1

// 4. For the SOR method, when omega is near to 1, the solution and the convergence speed is similar to GS method (by definition).