Bisection Method

1. Start
2. Read x1, x2, e
   *Here x1 and x2 are initial guesses
   e is the absolute error i.e. the desired degree of accuracy*
3. Compute: f1 = f(x1) and f2 = f(x2)
4. If (f1*f2) > 0, then display initial guesses are wrong and goto (11).
   Otherwise continue.
5. x = (x1 + x2)/2
6. If ([(x1 – x2)/x] < e), then display x and goto (11).
   * Here [ ] refers to the modulus sign. *
7. Else, f = f(x)
8. If ((f*f1) > 0), then x1 = x and f1 = f.
9. Else, x2 = x and f2 = f.
10. Goto (5).
    Now the loop continues with new values.
11. Stop

Regula False Position Method

1. Start
2. Read values of x0, x1 and e
   *Here x0 and x1 are the two initial guesses
   e is the degree of accuracy or the absolute error i.e. the stopping criteria*
3. Computer function values f(x0) and f(x1)
4. Check whether the product of f(x0) and f(x1) is negative or not.
   If it is positive take another initial guesses.
   If it is negative then goto step 5.
5. Determine:
   x = [x0*f(x1) – x1*f(x0)] / (f(x1) – f(x0))
6. Check whether the product of f(x1) and f(x) is negative or not.
   If it is negative, then assign x0 = x;
   If it is positive, assign x1 = x;
7. Check whether the value of f(x) is greater than 0.00001 or not.
   If yes, goto step 5.
   If no, goto step 8.
   Here the value 0.00001 is the desired degree of accuracy, and hence the stopping criteria.
8. Display the root as x.
9. Stop

Newton Raphson Method

1. Start
2. Read x, e, n, d
   *x is the initial guess
   e is the absolute error i.e the desired degree of accuracy
   n is for operating loop
   d is for checking slope*
3. Do for i =1 to n in step of 2
4. f = f(x)
5. f1 = f'(x)
6. If ([f1] < d), then display too small slope and goto 11.
   [ ] is used as modulus sign
7. x1 = x – f/f1
8. If ([(x1 – x)/x1] < e), the display the root as x1 and goto 11.
   [ ] is used as modulus sign
9. x = x1 and end loop
10. Display method does not converge due to oscillation.
11. Stop

Secant Method

1. Start
2. Get values of x0, x1 and e
   *Here x0 and x1 are the two initial guesses
   e is the stopping criteria, absolute error or the desired degree of accuracy*
3. Compute f(x0) and f(x1)
4. Compute x2 = [x0*f(x1) – x1*f(x0)] / [f(x1) – f(x0)]
5. Test for accuracy of x2
   If [(x2 – x1)/x2] > e, *Here [ ] is used as modulus sign*
   then assign x0 = x1 and x1 = x2
   goto step 4
   Else,
   goto step 6
6. Display the required root as x2.
7. Stop

Gauss Elimination Method

1. Start
2. Declare the variables and read the order of the matrix n.
3. Take the coefficients of the linear equation as:
   Do for k=1 to n
   Do for j=1 to n+1
   Read a[k][j]
   End for j
   End for k
4. Do for k=1 to n-1
   Do for i=k+1 to n
   Do for j=k+1 to n+1
   a[i][j] = a[i][j] – a[i][k] /a[k][k] * a[k][j]
   End for j
   End for i
   End for k
5. Compute x[n] = a[n][n+1]/a[n][n]
6. Do for k=n-1 to 1
   sum = 0
   Do for j=k+1 to n
   sum = sum + a[k][j] * x[j]
   End for j
   x[k] = 1/a[k][k] * (a[k][n+1] – sum)
   End for k
7. Display the result x[k]
8. Stop

Gauss Jordan Method

1. Start
2. Read the order of the matrix ‘n’ and read the coefficients of the linear equations.
3. Do for k=1 to n
   Do for l=k+1 to n+1
   a[k][l] = a[k][l] / a[k][k]
   End for l
   Set a[k][k] = 1
   Do for i=1 to n
   if (i not equal to k) then,
   Do for j=k+1 to n+1
   a[i][j] = a[i][j] – (a[k][j] * a[i][k])
   End for j
   End for i
   End for k
4. Do for m=1 to n
   x[m] = a[m][n+1]
   Display x[m]
   End for m
5. Stop

Gauss Seidal Method

1. Start
2. Declare the variables and read the order of the matrix n
3. Read the stopping criteria
4. Read the coefficients aim as
   Do for i=1 to n
   Do for j=1 to n
   Read a[i][j]
   Repeat for j
   Repeat for i
5. Read the coefficients b[i] for i=1 to n
6. Initialize x0[i] = 0 for i=1 to n
7. Set key=0

Continued……

8. For i=1 to n
   Set sum = b[i]
   For j=1 to n
   If (j not equal to i)
   Set sum = sum – a[i][j] * x0[j]
   Repeat j
   x[i] = sum/a[i][i]
   If absolute value of ((x[i] – x0[i]) / x[i]) > er, then
   Set key = 1
   Set x0[i] = x[i]
   Repeat i
9. If key = 1, then
   Goto step 6
   Otherwise print results