

Sample 7. Psi and polygamma functions.

$$\text{Sum (n=1 to infinity) } 1/(n^{**2} * (\gamma n+1)^{**2}) = \\ .013499486145413024755107829105035147950644978635837270816327$$

Sample 8. Incomplete gamma and gamma functions.

$$\text{Probability} = .193733130114871446327510259182505999534723186071213869730663$$

Sample 9. Error function. Probability that a value drawn from a normal distribution is within k standard deviations from the mean.

$$\begin{aligned} k = 1, \text{ probability} &= .68268949213708589717046509126407584495582593345321 \\ k = 2, \text{ probability} &= .95449973610364158559943472566693312505644755259664 \\ k = 3, \text{ probability} &= .99730020393673981094669637046481004524434126368324 \end{aligned}$$

Sample 10. Eigenvalue from matrix powers.

Iteration	eigenvalue approximation
1	24.238372093023255813953488372093023255813953488372093023256
2	23.913064457596406344892377530895927499788142161414894216112
3	23.912767173080067549422508320051584489821761621077098788515
4	23.912767172321328589362041859914215096468342615030281071820
5	23.912767172321328589357039228003304505549129411762921508588
6	23.912767172321328589357039228003304505549129195999272982168
7	23.912767172321328589357039228003304505549129195999272982168

The corresponding eigenvector is

$$\begin{aligned} &.261767370446674646792962130450573876653229364533233926774 \\ &.427657441555113861658087609816426954331976576625316869561 \\ &.702622032727792741311136111781916313570256073497278071852 \\ &.331326981028071028200774826381622268381700049086256824155 \\ &.380961503593547602959695624571404019706840413977365377249 \end{aligned}$$

Sample 11. Function and subroutine example.

$$\text{Integral} = .520499877813046537682746653892$$

Sample 12. Complex root of $f(x) = x^{**5} - 3x^{**4} + x^{**3} - 4x^{**2} + x - 6 = 0$.

Iteration	Newton approximation
0	.56000000000000000000000000000000 + 1.060000000000000000000000000000 i
1	.561964780980333719745880263787 + 1.061135231152741154895778904059 i
2	.561958308372772219534516409947 + 1.061134679566247415769456345141 i
3	.561958308335403235495113920123 + 1.061134679604332556981397796290 i
4	.561958308335403235498111195347 + 1.061134679604332556983391239059 i
5	.561958308335403235498111195347 + 1.061134679604332556983391239059 i

Sample 13. 44 terms were added to get $\exp(1.23-2.34i)$.

Result= -2.379681796854777515745457977697 - 2.458032970832342652397461908326 i

Sample 14. Exception handling.

Iterate $\exp(x)$ starting at 1.0 until overflow occurs.

Iteration 1	2.7182818284590452353602874713526624977572M+0
Iteration 2	1.5154262241479264189760430272629911905529M+1
Iteration 3	3.8142791047602205922092195940982035710239M+6
Iteration 4	2.3315043990071954622896899110121376663320M+1656520
Iteration 5	+ OVERFLOW

Overflow was correctly detected.

All results were ok -- no errors were found.