

Sample 7. Psi and polygamma functions.

Sum (n=1 to infinity) $1/(n^2 * (8n+1)^2) =$
.013499486145413024755107829105035147950644978635837270816327

Sample 8. Incomplete gamma and gamma functions.

Probability = .193733130114871446327510259182505999534723186071213869730663

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

k = 1, probability = .68268949213708589717046509126407584495582593345321
k = 2, probability = .95449973610364158559943472566693312505644755259664
k = 3, probability = .99730020393673981094669637046481004524434126368324

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

.261767370446674646792962130450573876653229364533233926774
.427657441555113861658087609816426954331976576625316869561
.702622032727792741311136111781916313570256073497278071852
.331326981028071028200774826381622268381700049086256824155
.380961503593547602959695624571404019706840413977365377249

Sample 11. Function and subroutine example.

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 + 1.06000000000000000000000000000000 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.