Project 2 Raktim Biswas

Cholesky

n	InfNorm(b-A*x)
10	0.0049
50	3.4766e-04
100	9.3234e-05
200	2.4140e-05
300	1.0855e-05
400	6.1416e-06
500	3.9444e-06

Jacobi

n	InfNorm(b-A*x^(k))	Rho(T)	Iterations
10	1.9043e-04	0.9595	68
50	1.9789e-04	0.9981	50
100	9.4195e-05	0.9995	1
200	2.4262e-05	0.9999	1
300	1.0891e-05	0.9999	1
400	6.1570e-06	1.0000	1
500	3.9523e-06	1.0000	1

a. Accuracy increases as n increases. For Cholesky if we plot n on the x axis and the norm of the residual on the y axis we witness strict exponential decay. Similarly we see exponential decay with Jacobi although we initially see a slight increase from n=10 to n=50 for some reason.
b. We observe that the number of iterations decreases significantly from n=10 to n=100, and the number of iterations equals 1 for n>=100.

c. We see that the spectral radius of the iterative matrix is less than or equal to 1. This is likely due to rounding since there's no point that the spectral radius is greater than 1. The behavior we observe confirms that our approximation x^(k) converges to x. Additionally this means our approximations will always converge for any initial guess x^(0)
d. Resources
    a. https://homel.vsb.cz/~dom033/predmety/parisLA/02_direct_methods.pdf
    b. https://www.youtube.com/watch?v=4SWMzENcgSE
    c. https://www.youtube.com/watch?v=qNKyw5ED7eM&t=44s
    d. https://www.youtube.com/watch?v=VH0TZlkZPRo