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| Class B.Tech CsBs | Batch: 1 |
| Date of Experiment: 25-07-2021 | Subject: IT/WS |

1. The sum of a geometric series

1+r+r2+r3+……….+rn= (1-rN)/(1-r);

N=number of terms in a series.

Accept the value of r and n as input from keyboard. Verify the above equation

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| r = 2  r =  2  >> N = 20  N =  20  >> x = (1-r^N)/(1-r)  x =  1048575  >> y = sum(r.^(0:N-1))  y =  1048575  >> logical(x == y)  ans =  logical  1 |

1. Accept a square matrix A of any size from keyboard.

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| >> A = [9,9,3;7,2,7;2,8,5]  A =  9 9 3  7 2 7  2 8 5 |

Find:

1. Size of A matrix

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| >> size(A)  ans =   1. 3 |

1. Determinant of A matrix

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| >> det(A)  ans =  -447.0000 |

1. Display whether matrix A is singular or not

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| >> cond(A)  ans =  4.0913 |

1. Transpose of A matrix

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| >> B = transpose(A)  B =  9 7 2  9 2 8  3 7 5 |

1. Perform A+A’, A-A’

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| >> C = A + B  C =  18 16 5  16 4 15  5 15 10  >> D = A - B  D =  0 2 1  -2 0 -1  -1 1 0 |

1. Find inverse of A matrix

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| >> inv(A)  ans =  0.1029 0.0470 -0.1275  0.0470 -0.0872 0.0940  -0.1163 0.1208 0.1007 |

1. Perform A\*A’ and A.\*A’

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| >> A\*B  ans =  171 102 105  102 102 65  105 65 93  >> A.\*B  ans =  81 63 6  63 4 56  6 56 25 |

1. Find square of A matrix

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| 1. >> F = A\*A 2. F = 3. 150 123 105 4. 91 123 70 5. 84 74 87 |

1. Find rank of A matrix

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| >> rank (A)  ans =  3 |

1. Find eigenvalues and eigenvectors of A matrix

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| >> eig(A)  ans =  17.5118  4.3526  -5.8644  >> [V,D] = eig(A)  V =  -0.7183 -0.6835 0.3698  -0.5284 0.1125 -0.7794  -0.4527 0.7213 0.5058  D =  17.5118 0 0  0 4.3526 0  0 0 -5.8644 |

1. Create a vector and a matrix with the following commands: v=0:0.2:12 and M=[sin(v); cos(v)]. Find the sizes of v and M and extract the first 10 elements of each row of the matrix and display them as column vectors.

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| >> v=0:0.2:12  v =  Columns 1 through 12  0 0.2000 0.4000 0.6000 0.8000 1.0000 1.2000 1.4000 1.6000 1.8000 2.0000 2.2000  Columns 13 through 24  2.4000 2.6000 2.8000 3.0000 3.2000 3.4000 3.6000 3.8000 4.0000 4.2000 4.4000 4.6000  Columns 25 through 36  4.8000 5.0000 5.2000 5.4000 5.6000 5.8000 6.0000 6.2000 6.4000 6.6000 6.8000 7.0000  Columns 37 through 48  7.2000 7.4000 7.6000 7.8000 8.0000 8.2000 8.4000 8.6000 8.8000 9.0000 9.2000 9.4000  Columns 49 through 60  9.6000 9.8000 10.0000 10.2000 10.4000 10.6000 10.8000 11.0000 11.2000 11.4000 11.6000 11.8000  Column 61  12.0000  >> M=[sin(v); cos(v)]  M =  Columns 1 through 12  0 0.1987 0.3894 0.5646 0.7174 0.8415 0.9320 0.9854 0.9996 0.9738 0.9093 0.8085  1.0000 0.9801 0.9211 0.8253 0.6967 0.5403 0.3624 0.1700 -0.0292 -0.2272 -0.4161 -0.5885  Columns 13 through 24  0.6755 0.5155 0.3350 0.1411 -0.0584 -0.2555 -0.4425 -0.6119 -0.7568 -0.8716 -0.9516 -0.9937  -0.7374 -0.8569 -0.9422 -0.9900 -0.9983 -0.9668 -0.8968 -0.7910 -0.6536 -0.4903 -0.3073 -0.1122  Columns 25 through 36  -0.9962 -0.9589 -0.8835 -0.7728 -0.6313 -0.4646 -0.2794 -0.0831 0.1165 0.3115 0.4941 0.6570  0.0875 0.2837 0.4685 0.6347 0.7756 0.8855 0.9602 0.9965 0.9932 0.9502 0.8694 0.7539  Columns 37 through 48  0.7937 0.8987 0.9679 0.9985 0.9894 0.9407 0.8546 0.7344 0.5849 0.4121 0.2229 0.0248  0.6084 0.4385 0.2513 0.0540 -0.1455 -0.3392 -0.5193 -0.6787 -0.8111 -0.9111 -0.9748 -0.9997  Columns 49 through 60  -0.1743 -0.3665 -0.5440 -0.6999 -0.8278 -0.9228 -0.9809 -1.0000 -0.9792 -0.9193 -0.8228 -0.6935  -0.9847 -0.9304 -0.8391 -0.7143 -0.5610 -0.3853 -0.1943 0.0044 0.2030 0.3935 0.5683 0.7204  Column 61  -0.5366  0.8439  >> size(v)  ans =  1 61  >> size(M)  ans =  2 61  >> M(:,1:10)  ans =  0 0.1987 0.3894 0.5646 0.7174 0.8415 0.9320 0.9854 0.9996 0.9738  1.0000 0.9801 0.9211 0.8253 0.6967 0.5403 0.3624 0.1700 -0.0292 -0.2272 |

1. The polar equation of a circle is given by x=r cosθ, y=r sinθ. Take θ= 0 to 2π with step size of π/16 and plot the circle on x-y axis for given value of radius r. Give labels to axis and title to the figure. Make use of new figure and redraw the circle with distinct points shown by ‘o’ rather than a continuous plot. Now combine the two plots in new figure to show the line through the data points as well as the distinct data points.

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| >> theta = 0:pi/16:2\*pi  theta =  Columns 1 through 12  0 0.1963 0.3927 0.5890 0.7854 0.9817 1.1781 1.3744 1.5708 1.7671 1.9635 2.1598  Columns 13 through 24  2.3562 2.5525 2.7489 2.9452 3.1416 3.3379 3.5343 3.7306 3.9270 4.1233 4.3197 4.5160  Columns 25 through 33  4.7124 4.9087 5.1051 5.3014 5.4978 5.6941 5.8905 6.0868 6.2832  >> x = r\*cos(theta)  x =  Columns 1 through 12  2.0000 1.9616 1.8478 1.6629 1.4142 1.1111 0.7654 0.3902 0.0000 -0.3902 -0.7654 -1.1111  Columns 13 through 24  -1.4142 -1.6629 -1.8478 -1.9616 -2.0000 -1.9616 -1.8478 -1.6629 -1.4142 -1.1111 -0.7654 -0.3902  Columns 25 through 33  -0.0000 0.3902 0.7654 1.1111 1.4142 1.6629 1.8478 1.9616 2.0000  >> y = r\*sin(theta)  y =  Columns 1 through 12  0 0.3902 0.7654 1.1111 1.4142 1.6629 1.8478 1.9616 2.0000 1.9616 1.8478 1.6629  Columns 13 through 24  1.4142 1.1111 0.7654 0.3902 0.0000 -0.3902 -0.7654 -1.1111 -1.4142 -1.6629 -1.8478 -1.9616  Columns 25 through 33  -2.0000 -1.9616 -1.8478 -1.6629 -1.4142 -1.1111 -0.7654 -0.3902 -0.0000  >> r = 10  r =  10  >> x = r\*cos(theta)  x =  Columns 1 through 12  10.0000 9.8079 9.2388 8.3147 7.0711 5.5557 3.8268 1.9509 0.0000 -1.9509 -3.8268 -5.5557  Columns 13 through 24  -7.0711 -8.3147 -9.2388 -9.8079 -10.0000 -9.8079 -9.2388 -8.3147 -7.0711 -5.5557 -3.8268 -1.9509  Columns 25 through 33  -0.0000 1.9509 3.8268 5.5557 7.0711 8.3147 9.2388 9.8079 10.0000  >> y = r\*sin(theta)  y =  Columns 1 through 12  0 1.9509 3.8268 5.5557 7.0711 8.3147 9.2388 9.8079 10.0000 9.8079 9.2388 8.3147  Columns 13 through 24  7.0711 5.5557 3.8268 1.9509 0.0000 -1.9509 -3.8268 -5.5557 -7.0711 -8.3147 -9.2388 -9.8079  Columns 25 through 33  -10.0000 -9.8079 -9.2388 -8.3147 -7.0711 -5.5557 -3.8268 -1.9509 -0.0000  >> plot(x,y)  >> plot(x,y)  >> plot(x,y,'O')  >> plot(x,y,'O')  >> xlabel('X-Axis')  >> ylabel('Y-Axis')  >> title('Plot Made by Varun Khadayate A016') |

Shape

Description automatically generated