### Homework 14

Problem 1:

% Given vectors

A = [5, -2, 4];

B = [3, -6, 7];

C = [2, 3, -5];

D = [-1, -1, -1];

% Length of A

lengthA = norm(A);

disp(['Length of A = ', num2str(lengthA)])

% Length of B

lengthB = norm(B);

disp(['Length of B = ', num2str(lengthB)])

% Scalar product of A and B

scalarProductAB = dot(A, B);

disp(['Scalar product of A and B = ', num2str(scalarProductAB)])

% Angle between A and B (rad)

angleAB\_rad = acosd(dot(A, B) / (norm(A) \* norm(B)));

disp(['Angle between A and B (in radians) = ', num2str(angleAB\_rad)])

Length of A = **6.7082**

Length of B = **9.6954**

Scalar product of A and B = **55**

Angle between A and B (in radians) = **32.258**

Problem 2:

% Cross product of A and C

crossProductAC = cross(A, C);

% x component of A x C vector

xComponentAC = crossProductAC(1);

disp(['x component of A x C vector = ', num2str(xComponentAC)])

% y component of A x C vector

yComponentAC = crossProductAC(2);

disp(['y component of A x C vector = ', num2str(yComponentAC)])

% z component of A x C vector

zComponentAC = crossProductAC(3);

disp(['z component of A x C vector = ', num2str(zComponentAC)])

x component of A x C vector = **-2**

y component of A x C vector = **33**

z component of A x C vector = **19**

Problem 3:

% Given vectors

A = [5, -2, 4];

B = [3, -6, 7];

C = [2, 3, -5];

D = [-1, -1, -1];

% Cross product of A and D

crossProductAD = cross(A, D);

% Cross product of (A x D) and B

result = cross(crossProductAD, B);

% Extracting components

xComponentResult = result(1);

yComponentResult = result(2);

zComponentResult = result(3);

% Display the results

disp(['x component of (A x D) x B vector = ', num2str(xComponentResult)])

disp(['y component of (A x D) x B vector = ', num2str(yComponentResult)])

disp(['z component of (A x D) x B vector = ', num2str(zComponentResult)])

x component of (A x D) x B vector = **-35**

y component of (A x D) x B vector = **-63**

z component of (A x D) x B vector = **-39**

Problem 4:

% Given vectors

A = [5, -2, 4];

B = [3, -6, 7];

C = [2, 3, -5];

D = [-1, -1, -1];

% Cross product of A and D

crossProductAD = cross(A, D);

% Triple scalar product of (A x D) and C

tripleScalarProduct = dot(crossProductAD, C);

% Display the result

disp(['Triple scalar product (A x D) \* C = ', num2str(tripleScalarProduct)])

Triple scalar product (A x D) \* C = **50**