**線性代數程式作業 HW 03**

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<PROBLEM\_1>

1 4 0 2 0 0

0 0 1 -1 0 0

0 0 0 0 1 0

0 0 0 0 0 1

-->> No solution

1 0 2 0 0

0 1 7 0 0

0 0 0 1 0

0 0 0 0 1

0 0 0 0 0

-->> No solution

<PROBLEM\_2>

rank of A = 3

rank of transpose A = 3

rank of product of transpose A by A = 3

rank of B = 3

rank of transpose B = 3

rank of product of transpose B by B = 3

nullity of A is 2

nullity of transpose A is 1

nullity of product of transpose A by A is 2

nullity of B is 1

nullity of transpose B is 2

nullity of product of transpose B by B is 1

<PROBLEM\_3>

the basis for the null space of A is

[ -4, -2]

[ 1, 0]

[ 0, 1]

[ 0, 1]

[ 0, 0]

the basis for the column space of A is

[ 1, 0, 0]

[ 0, 1, 0]

[ 0, 0, 1]

[ -1/4, 5/4, 3/4]

the basis for the row space of A is

[ 1, 4, 0, 2, 0]

[ 0, 0, 1, -1, 0]

[ 0, 0, 0, 0, 1]

the basis for the null space of B is

-2

-7

1

0

the basis for the column space of B is

[ 1, 0, 0]

[ 0, 1, 0]

[ 1, -2, 0]

[ 0, 0, 1]

[ 1, 3, -5]

the basis for the row space of B is

[ 1, 0, 2, 0]

[ 0, 1, 7, 0]

[ 0, 0, 0, 1]

<PROBLEM\_4>

Do A and X have the same rank?

Yes.

Do A and X have the same column space?

Yes.

Do A and X have the same null space?

No

Do A and X have the same row space?

No