NUMERICAL ANALYSIS

HW2

PART 2

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Coordinates in image B(x,y)	Coordinates in image F(x',y')
[1,2]	[2,2]
[2,1]	[-1,4]
[3,1]	[-4,4]

$$\begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ 0 & 0 & 1 \end{vmatrix} \begin{vmatrix} x \\ y \\ 1 \end{vmatrix} = \begin{vmatrix} x' \\ y' \\ 1 \end{vmatrix}$$

$a_{11} + 2a_{12} + a_{13} = 2$

$a_{21} + 2a_{22} + a_{23} = 2$

$2a_{11} + a_{12} + a_{13} = -1$

$2a_{12} + a_{22} + a_{23} = 4$

$3a_{11} + a_{12} + a_{13} = -4$

$3a_{21} + a_{22} + a_{23} = 4$

$a_{11} = -3$

$a_{12} = 0$

$a_{13} = 5$

$a_{21} = 0$

$a_{22} = -2$

$a_{23} = 6$

$$A = \begin{vmatrix} -3 & 0 & 5 \\ 0 & -2 & 6 \\ 0 & 0 & 1 \end{vmatrix}$$

$$\begin{vmatrix} -3 & 0 & 5 \\ 0 & -2 & 6 \\ 0 & 0 & 1 \end{vmatrix} \begin{vmatrix} k_{11} & k_{12} & k_{13} \\ k_{21} & k_{22} & k_{23} \\ k_{31} & k_{32} & k_{33} \end{vmatrix} = \begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix}$$

$-3k_{11} + 5k_{31} = 1$

$-3k_{12} + 5k_{32} = 0$

$k_{31} = 0$

$-3k_{13} + 5k_{33} = 0$

$-2k_{21} + 6k_{31} = 0$

$k_{32} = 0$

$-2k_{22} + 6k_{32} = 1$

$-2k_{23} + 6k_{33} = 0$

$k_{33} = 1$

$k_{21} = 0$

$k_{22} = -1/2$

$k_{23} = 3$

$k_{11} = -1/3$

$k_{12} = 0$

$k_{13} = 5/3$

$$A^{-1} = \begin{vmatrix} -1/3 & 0 & 5/3 \\ 0 & -1/2 & 3 \\ 0 & 0 & 1 \end{vmatrix}$$