B matrix from paper

$$B = \begin{bmatrix} 0.2816 & -0.0052 & -0.0406 & -0.0305 & -0.0316 & -0.0505 \\ -0.0112 & 0.2553 & -0.0423 & -0.0666 & -0.0756 & -0.0346 \\ -0.0470 & -0.0332 & 0.2795 & -0.0064 & -0.0237 & -0.0530 \\ -0.0308 & -0.0646 & -0.0129 & 0.2348 & -0.0833 & -0.0193 \\ -0.0411 & -0.0661 & -0.0217 & -0.0760 & 0.2537 & -0.0118 \\ -0.0477 & -0.0208 & -0.0402 & -0.0250 & -0.0056 & 0.2302 \end{bmatrix}$$

Amplifier gain matrix

$$k_A = \begin{bmatrix} 0.3618 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0.3614 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0.3536 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0.3532 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0.3573 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0.3610 \end{bmatrix}$$

Excitation : 1 Hz , 2V

$$|B| = \begin{bmatrix} 0.24658067 & -0.00632653 & -0.03360383 & -0.03693433 & -0.04377303 & -0.03758178 \\ -0.00382582 & 0.30378633 & -0.04427679 & -0.07201857 & -0.07833279 & -0.04142051 \\ -0.03879909 & -0.03543384 & 0.21901965 & -0.00584744 & -0.02633413 & -0.03772986 \\ -0.02718124 & -0.0853105 & -0.00592537 & 0.24953415 & -0.07784175 & -0.0247489 \\ -0.04143301 & -0.08095197 & -0.02381626 & -0.07517963 & 0.25972779 & -0.00510934 \\ -0.02576626 & -0.04007577 & -0.02666458 & -0.02938011 & -0.00287754 & 0.20256056 \end{bmatrix}$$

$$\angle B = \begin{bmatrix} -11.0929065 & 171.37958849 & 170.15605542 & 164.16890612 & 164.2913455 & 170.40600012 \\ 178.88323324 & -11.03143089 & 167.95879458 & 168.66897165 & 169.1887177 & 168.08660986 \\ 170.12246128 & 164.06049162 & -11.41548471 & 169.90626308 & 163.98896919 & 169.94117952 \\ 168.17439832 & 169.01241655 & 175.09208094 & -11.58580977 & 168.91597365 & 169.05146885 \\ 168.65296226 & 169.29560318 & 169.30510804 & 168.61793995 & -11.20150327 & 177.72878576 \\ 170.73405494 & 165.21321701 & 170.03201216 & 164.3900047 & 169.95760824 & -10.51943147 \end{bmatrix}$$

Excitation : 10 Hz , 2V

$$|B| = \begin{bmatrix} 0.24473899 & 0.00630781 & 0.03361222 & 0.0361936 & 0.04289841 & 0.03756457 \\ 0.00433558 & 0.3023654 & 0.04433865 & 0.07116422 & 0.07775933 & 0.0414471 \\ 0.0387033 & 0.03514576 & 0.21811014 & 0.00587409 & 0.02621208 & 0.0378427 \\ 0.0268988 & 0.08488403 & 0.006037 & 0.24658481 & 0.07744211 & 0.0245942 \\ 0.04067364 & 0.08058258 & 0.02330298 & 0.07423617 & 0.25830651 & 0.0052639 \\ 0.02586118 & 0.03908048 & 0.02677974 & 0.02828104 & 0.00287592 & 0.20152426 \end{bmatrix}$$

$$\angle B = \begin{bmatrix} -13.85566535 & 165.23607151 & 169.25811048 & 159.80591732 & 159.79697418 & 169.15989795 \\ 170.76281035 & -14.54258525 & 164.35552368 & 164.67927196 & 165.64108116 & 163.87824959 \\ 168.96845388 & 159.96627477 & -14.00811928 & 162.56382526 & 159.99134334 & 168.32010519 \\ 165.07704402 & 165.31556113 & 178.85848934 & -15.34821974 & 165.20295802 & 166.16069013 \\ 164.66652664 & 165.81282297 & 166.8029658 & 164.83186554 & -14.70657283 & 176.91781302 \\ 170.20433477 & 160.49438525 & 169.03765805 & 159.76726604 & 157.06255937 & -13.3885864 \end{bmatrix}$$

Excitation : 10 Hz , 1V

$$|B| = \begin{bmatrix} 0.20517077 & 0.00462251 & 0.03089278 & 0.02320509 & 0.0306122 & 0.03348252 \\ 0.00225417 & 0.19363567 & 0.03076385 & 0.03879625 & 0.06119516 & 0.01967132 \\ 0.0351563 & 0.02359303 & 0.17968416 & 0.0041388 & 0.01711158 & 0.03376356 \\ 0.02423946 & 0.05740677 & 0.00524877 & 0.18430113 & 0.06878141 & 0.01357055 \\ 0.03288766 & 0.06835307 & 0.01852937 & 0.06166438 & 0.21389108 & 0.00489316 \\ 0.02408791 & 0.01965349 & 0.02336306 & 0.01477262 & 0.00152933 & 0.14840225 \end{bmatrix}$$

KI matrix for measurement inverse model

$$\text{KImeasInv} = \begin{bmatrix} 1.34390728 & -0.39583777 & -0.31621157 & -0.16403375 & -0.13345366 & -0.33437054 \\ -0.28336617 & 0.80189302 & -0.03033083 & -0.23060068 & -0.24647795 & -0.01111738 \\ -0.29251396 & -0.14001728 & 1.26687237 & -0.37959149 & -0.16924645 & -0.28550319 \\ -0.03744782 & -0.22493618 & -0.27927585 & 0.82230575 & -0.22839872 & -0.05224718 \\ 0.00585624 & -0.24470864 & -0.06371571 & -0.23125485 & 0.82503219 & -0.29120923 \\ -0.32533638 & -0.12923645 & -0.29452210 & -0.16636538 & -0.39556121 & 1.31102152 \end{bmatrix}$$

KI matrix for modified inverse model

$$\text{KImdfyInv} = \begin{bmatrix} 1.09028407 & -0.32768104 & -0.29314830 & -0.09587702 & -0.06529693 & -0.30828078 \\ -0.28499664 & 0.83270594 & -0.07413386 & -0.19978776 & -0.21566503 & -0.05812265 \\ -0.27200788 & -0.07350130 & 1.02748073 & -0.31307551 & -0.10273048 & -0.26616557 \\ -0.08064116 & -0.19599993 & -0.28216451 & 0.85124201 & -0.19946247 & -0.09297395 \\ -0.04496228 & -0.21425886 & -0.10293891 & -0.20080507 & 0.85548196 & -0.29251684 \\ -0.30072111 & -0.06123104 & -0.27504255 & -0.09835997 & -0.32755580 & 1.06291047 \end{bmatrix}$$

KI matrix for Hall sensor inverse model

$$\text{KIhallInv} = \begin{bmatrix} 2.2523749 & 0 & 0 & 0 & 0 & 0 \\ 0 & 2.7488400 & 0 & 0 & 0 & 0 \\ 0 & 0 & 2.2456229 & 0 & 0 & 0 \\ 0 & 0 & 0 & 2.2936800 & 0 & 0 \\ 0 & 0 & 0 & 0 & 2.8320400 & 0 \\ 0 & 0 & 0 & 0 & 0 & 2.2947314 \end{bmatrix}$$

inv_B

$$\text{inv\_B} = \begin{bmatrix} 1.254 \times 10^{3} & 3.659 \times 10^{2} & 3.627 \times 10^{2} & 5.093 \times 10^{2} & 5.107 \times 10^{2} & 4.781 \times 10^{2} \\ 3.547 \times 10^{2} & 1.162 \times 10^{3} & 3.879 \times 10^{2} & 6.699 \times 10^{2} & 6.925 \times 10^{2} & 4.486 \times 10^{2} \\ 4.275 \times 10^{2} & 4.539 \times 10^{2} & 1.259 \times 10^{3} & 4.393 \times 10^{2} & 4.880 \times 10^{2} & 5.208 \times 10^{2} \\ 4.425 \times 10^{2} & 6.546 \times 10^{2} & 3.538 \times 10^{2} & 1.461 \times 10^{3} & 8.005 \times 10^{2} & 4.488 \times 10^{2} \\ 4.142 \times 10^{2} & 5.725 \times 10^{2} & 3.374 \times 10^{2} & 6.875 \times 10^{2} & 1.274 \times 10^{3} & 3.747 \times 10^{2} \\ 4.122 \times 10^{2} & 4.009 \times 10^{2} & 3.685 \times 10^{2} & 4.744 \times 10^{2} & 4.074 \times 10^{2} & 1.372 \times 10^{3} \end{bmatrix} \times \text{tune\_L3}$$

tune_L3 = ThreeD_sine_theta

$$\mathrm{KI}_{\mathrm{theo}} = \begin{bmatrix} \frac{5}{6} & -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} \\ -\frac{1}{6} & \frac{5}{6} & -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} \\ -\frac{1}{6} & -\frac{1}{6} & \frac{5}{6} & -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} \\ -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} & \frac{5}{6} & -\frac{1}{6} & -\frac{1}{6} \\ -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} & \frac{5}{6} & -\frac{1}{6} \\ -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} & \frac{5}{6} \end{bmatrix}$$

Calc_FNor_FromSixCurr_KItheo

Calc_Nxyz_KItheo (N 矩陣)

Calc_Pre_L (L 矩陣參數)

Calc_Lx (X 方向 L 矩陣)

Calc_Ly (Y 方向 L 矩陣)

Calc_Lz (Z 方向 L 矩陣)

CalcMat_6x6_6x6_6x6 (N = KItheo^T × L × KItheo)

CalcMat_1x6_6x6_6x1 (I^T × N × I)

$$B \times k_A^{-1} = \begin{bmatrix} 0.778331 & -0.014388 & -0.114819 & -0.086353 & -0.088441 & -0.139889 \\ -0.030956 & 0.706419 & -0.119627 & -0.188562 & -0.211587 & -0.095845 \\ -0.129906 & -0.091865 & 0.790441 & -0.018120 & -0.066331 & -0.146814 \\ -0.085130 & -0.178749 & -0.036482 & 0.664779 & -0.233137 & -0.053463 \\ -0.113599 & -0.182900 & -0.061369 & -0.215176 & 0.710048 & -0.032687 \\ -0.131841 & -0.057554 & -0.113688 & -0.070781 & -0.015673 & 0.637673 \end{bmatrix}$$

$$B^{-1} = \begin{bmatrix} 4.537745 & 1.262281 & 1.304083 & 1.702787 & 1.660089 & 1.713294 \\ 1.791069 & 6.097167 & 1.914850 & 3.337411 & 3.363285 & 2.202419 \\ 1.502074 & 1.536483 & 4.476497 & 1.455612 & 1.580672 & 1.794164 \\ 2.018073 & 3.084840 & 1.649475 & 6.827655 & 3.611612 & 2.043706 \\ 2.010733 & 2.917762 & 1.654367 & 3.395828 & 6.372430 & 1.871903 \\ 1.632493 & 1.486789 & 1.444353 & 1.732688 & 1.471162 & 5.478867 \end{bmatrix}$$

$$B_{\text{original}}^{-1} = \begin{bmatrix} 4.514700 & 1.185511 & 1.279866 & 1.660646 & 1.617628 & 1.685414 \\ 1.679753 & 5.726351 & 1.797874 & 3.133857 & 3.158185 & 2.067752 \\ 1.474023 & 1.443037 & 4.447018 & 1.404317 & 1.528987 & 1.760228 \\ 1.961753 & 2.897227 & 1.590291 & 6.724668 & 3.507843 & 1.975572 \\ 1.957464 & 2.740310 & 1.598388 & 3.298419 & 6.274281 & 1.807460 \\ 1.605349 & 1.396366 & 1.415829 & 1.683051 & 1.421149 & 5.446029 \end{bmatrix}$$

$$B^{-1} = \begin{bmatrix} 5.197682 & 1.818962 & 1.718694 & 2.261508 & 2.298680 & 1.990719 \\ 1.490319 & 5.527731 & 2.033923 & 3.049754 & 3.063327 & 2.235576 \\ 1.712324 & 2.058866 & 5.775286 & 1.854326 & 2.074037 & 2.093308 \\ 1.896558 & 3.350293 & 1.807460 & 6.626899 & 3.524619 & 2.272204 \\ 2.028865 & 3.213460 & 1.993750 & 3.441743 & 6.416958 & 1.987263 \\ 1.485324 & 2.127628 & 1.671754 & 2.145232 & 1.773868 & 6.265677 \end{bmatrix}$$

$$\begin{aligned} \text{inv\_B}[0][0] &= 1254.43 \\ \text{inv\_B}[0][1] &= 365.92 \\ \text{inv\_B}[0][2] &= 362.72 \\ \text{inv\_B}[0][3] &= 509.35 \\ \text{inv\_B}[0][4] &= 510.70 \\ \text{inv\_B}[0][5] &= 478.06 \end{aligned}$$

$$B = \begin{bmatrix} 0.24658067 & -0.00632653 & -0.03360383 & -0.03693433 & -0.04377303 & -0.03758178 \\ -0.00382582 & 0.30378633 & -0.04427679 & -0.07201857 & -0.07833279 & -0.04142051 \\ -0.03879909 & -0.03543384 & 0.21901965 & -0.00584744 & -0.02633413 & -0.03772986 \\ -0.02718124 & -0.0853105 & -0.00592537 & 0.24953415 & -0.07784175 & -0.0247489 \\ -0.04143301 & -0.08095197 & -0.02381626 & -0.07517963 & 0.25972779 & -0.00510934 \\ -0.02576626 & -0.04007577 & -0.02666458 & -0.02938011 & -0.00287754 & 0.20256056 \end{bmatrix}$$

Paper 1

$$\left(\frac{B_1}{1-a_1+a_2}\right) = \begin{bmatrix} 0.26023 & -0.00576 & -0.03495 & -0.03918 & -0.04724 & -0.04983 \\ -0.00716 & 0.34710 & -0.04209 & -0.08139 & -0.10587 & -0.03949 \\ -0.04175 & -0.04674 & 0.25354 & -0.00677 & -0.03306 & -0.05518 \\ -0.02956 & -0.08542 & -0.00927 & 0.28306 & -0.10927 & -0.02100 \\ -0.04194 & -0.08618 & -0.02135 & -0.09183 & 0.33020 & -0.00925 \\ -0.04222 & -0.03203 & -0.03576 & -0.03325 & -0.00625 & 0.23510 \end{bmatrix}$$

Paper 2

$$\left(k * (1+b) * \frac{B_2}{1-a_1+a_2}\right) = \begin{bmatrix} 0.28160 & -0.00520 & -0.04060 & -0.03050 & -0.03160 & -0.05050 \\ -0.01110 & 0.26590 & -0.04230 & -0.06660 & -0.07560 & -0.03460 \\ -0.04700 & -0.03320 & 0.27950 & -0.00640 & -0.02370 & -0.05300 \\ -0.03080 & -0.06460 & -0.01290 & 0.23480 & -0.08330 & -0.01930 \\ -0.04110 & -0.06610 & -0.02170 & -0.07600 & 0.25370 & -0.01180 \\ -0.04770 & -0.02080 & -0.04020 & -0.02500 & -0.00560 & 0.23020 \end{bmatrix}$$