The adjoint of a 5x5 matrix

Soumadeep Ghosh

Kolkata, India

Abstract

In this paper, I describe the adjoint of a 5x5 matrix.
The paper ends with "The End"

Introduction

Adjoints of matrices are useful to solve linear systems.
In this paper, I describe the adjoint of a 5x5 matrix.

The adjoint of a 5x5 matrix

The adjoint of a 5x5 matrix

$$
M = \begin{pmatrix} a & b & c & d & e \\ f & g & h & i & j \\ k & l & m & n & o \\ p & q & r & s & t \\ u & v & w & x & y \end{pmatrix}
$$

is

$$
adjM = \begin{pmatrix} A & B & C & D & E \\ F & G & H & I & J \\ K & L & M & N & O \\ P & Q & R & S & T \\ U & V & W & X & Y \end{pmatrix}
$$

where

$$
A = jnrv - iorv - jmsv + hosv + imtv - hntv - jnqw + ioqw + jlsw - gosw - iltw + gntw + jmqx - hoqx - jlrx + gorx + hltx - gmtx - imqy + hnqy + ilry - gnry - hlsy + gmsy
$$

$$
B = -enrv + dorv + emsv - cosv - dmtv + cntv + enqw - doqw - elsw + bosw + dltw - bntw - emqx + coqx + elrx - borx - cltx + bmtx + dmqy - cnqy - dlry + bnry + clsy - bmsy
$$

$$
C = eirv - djrv - ehsv + cjsv + dhtv - citv - eiqw + djqw + egsw - bjsw - dgtw + bitw + ehqx - cjqx - egrx + bjrx + cgtx - bhtx - dhqy + ciqy + dgry - biry - cgsy + bhsy
$$

$$
D = -eimv + djmv + ehnv - cjnv - dhov + ciov + eilw - djlw - egnw + bjnw + dgow - biow - ehlx + cjlx + egmx - bjmx - cgox + bhox + dhly - cily - dgmy + bimy + cgny - bhny
$$

$$
E = eimq - djmq - ehnq + cjnq + dhoq - cioq - eilr + djlr + egnr - bjnr - dgor + bior + ehls - cjls - egms + bjms + cgos - bhos - dhlt + cilt + dgmt - bimt - cgnt + bhnt
$$

$$F = -jnru + ioru + jmsu - hosu - imtu + hntu + jnpw - iopw - jksw + fosw + iktw - fntw - jmpx + hopx + jkrx - forx - hktx + fmtx + impy - hnpy - ikry + fnry + hksy - fmsy$$

$$G = enru - doru - emsu + cosu + dmtu - cntu - enpw + dopw + eksw - aosw - dktw + antw + empx - copx - ekrx + aorx + cktx - amtx - dmpy + cnpy + dkry - anry - cksy + amsy$$

$$H = -eiru + djru + ehsu - cjsu - dhtu + citu + eipw - djpw - efsw + ajsw + dftw - aitw - ehpx + cjpx + efrx - ajrx - cftx + ahtx + dhpy - cipy - dfry + airy + cfsy - ahsy$$

$$I = eimu - djmu - ehnu + cjnu + dhou - ciou - eikw + djkw + efnw - ajnw - dfow + aiow + ehkx - cjkx - efmx + ajmx + cfox - ahox - dhky + ciky + dfmy - aimy - cfny + ahny$$

$$J = -eimp + djmp + ehnp - cjnp - dhop + ciop + eikr - djkr - efnr + ajnr + dfor - aior - ehks + cjks + efms - ajms - cfos + ahos + dhkt - cikt - dfmt + aimt + cfnt - ahnt$$

$$K = jnqu - ioqu - jlsu + gosu + iltu - gntu - jnpv + iopv + jksv - fosv - iktv + fntv + jlpx - gopx - jkqx + foqx + gktx - fltx - ilpy + gnpy + ikqy - fnqy - gksy + flsy$$

$$L = -enqu + doqu + elsu - bosu - dltu + bntu + enpv - dopv - eksv + aosv + dktv - antv - elpx + bopx + ekqx - aoqx - bktx + altx + dlpy - bnpy - dkqy + anqy + bksy - alsy$$

$$M = eiqu - djqu - egsu + bjsu + dgtu - bitu - eipv + djpv + efsv - ajsv - dftv + aitv + egpx - bjpx - efqx + ajqx + bftx - agtx - dgpy + bipy + dfqy - aiqy - bfsy + agsy$$

$$N = -eilu + djlu + egnu - bjnu - dgou + biou + eikv - djkv - efnv + ajnv + dfov - aiov - egkx + bjkx + eflx - ajlx - bfox + agox + dgky - biky - dfly + aily + bfny - agny$$

$$O = eilp - djlp - egnp + bjnp + dgop - biop - eikq + djkq + efnq - ajnq - dfoq + aioq + egks - bjks - efls + ajls + bfos - agos - dgkt + bikt + dflt - ailt - bfnt + agnt$$

$$P = -jmqu + hoqu + jlru - goru - hltu + gmtu + jmpv - hopv - jkrv + forv + hktv - fmtv - jlpw + gopw + jkqw - foqw - gktw + fltw + hlpy - gmpy - hkqy + fmqy + gkry - flry$$

$$Q = emqu - coqu - elru + boru + cltu - bmtu - empv + copv + ekrv - aorv - cktv + amtv + elpw - bopw - ekqw + aoqw + bktw - altw - clpy + bmpy + ckqy - amqy - bkry + alry$$

$$R = -ehqu + cjqu + egru - bjru - cgtu + bhtu + ehpv - cjpv - efrv + ajrv + cftv - ahtv - egpw + bjpw + efqw - ajqw - bftw + agtw + cgpy - bhpy - cfqy + ahqy + bfry - agry$$

$$S = ehlu - cjlu - egmu + bjmu + cgou - bhou - ehkv + cjkv + efmv - ajmv - cfov + ahov + egkw - bjkw - eflw + ajlw + bfow - agow - cgky + bhky + cfly - ahly - bfmy + agmy$$

$$T = -ehlp + cjlp + egmp - bjmp - cgop + bhop + ehkq - cjkq - efmq + ajmq + cfoq - ahoq - egkr + bjkr + eflr - ajlr - bfor + agor + cgkt - bhkt - cflt + ahlt + bfmt - agmt$$

$$U = imqu - hnqu - ilru + gnru + hlsu - gmsu - impv + hnpv + ikrv - fnrv - hksv + fmsv + ilpw - gnpw - ikqw + fnqw + gksw - flsw - hlpx + gmpx + hkqx - fmqx - gkrx + flrx$$

$$V = -dmqu + cnqu + dlru - bnru - clsu + bmsu + dmpv - cnpv - dkrv + anrv + cksv - amsv - dlpw + bnpw + dkqw - anqw - bksw + alsw + clpx - bmpx - ckqx + amqx + bkrx - alrx$$

$$W = dhqu - ciqu - dgru + biru + cgsu - bhsu - dhpv + cipv + dfrv - airv - cfsv + ahsv + dgpw - bipw - dfqw + aiqw + bfsw - agsw - cgpx + bhpx + cfqx - ahqx - bfrx + agrx$$

$$X = -dhlu + cilu + dgmu - bimu - cgnu + bhnu + dhkv - cikv - dfmv + aimv + cfnv - ahnv - dgkw + bikw + dflw - ailw - bfnw + agnw + cgkx - bhkx - cflx + ahlx + bfmx - agmx$$

$$Y = dhlp - cilp - dgmp + bimp + cgnp - bhnp - dhkq + cikq + dfmq - aimq - cfnq + ahnq + dgkr - bikr - dflr + ailr + bfnr - agnr - cgks + bhks + cfls - ahls - bfms + agms$$

The End