Hexpentaquaternions: a two−hand quaternion algebra

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A new method for solving quaternion equations.

Suppose we're given a quaternion equation

A[1]qB[1] + A[2]qB[2] + ... + A[n]qB[n] = C

and required to solve for q,

where A[k],B[k],C, q, are all quaternions from
Hamilton's right−hand system ij = +k. So,

q = q0.1 + q1.i + q2.j + q3.k
C = c0.1 + c1.i + c2.j + c3.k
A[k] = a[k,0].1 + a[k,1].i + a[k,2].j + a[k,3].k
B[k] = b[k,0].1 + b[k,1].i + b[k,2].j + b[k,3].k

and the right−hand basis elements obey the rules

i^2 = j^2 = k^2 = −1,
ij = −ji = +k
jk = −kj = +i
ki = −ik = +j

To solve the equation, all we need to do is
convert the B parameters into "left−hand" quaternions B'
so that we can move them over to the other side of the
q parameter, and write

A[1]B'[1]q + A[2]B'[2]q + ... + A[n]B'[n]q = C

then we can aggregate the factors

(A[1]B'[1] + A[2]B'[2] + ... + A[n]B'[n]) . q = C

and invert the equation

q = (A[1]B'[1] + A[2]B'[2] + ... + A[n]B'[n])^−1 . C that's it.

Details can be found in my new paper,

"Hexpentaquaternions: a two−hand quaternion algebra."
reference # hypcx−20060129a

available online here,

http://www.hypercomplex.com/research/emgrav/abs20060129a.html

The .pdf, .dvi, .djvu versions of the paper have active url links to
references around the web, but in the .ps paper these links are inactive.

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