Linear Optimization problem.....

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Hi,

I have a set of N points in 3d space, a set of M variables and a set of target positions for the N points. I need to find optimal values for the M variables which will put the input points as close to their target positions as possible.

A point is affected by each of the M variables through a simple linear interpolation relationship: P` = P0 + t(P1 − P0). Where P0 and P1 are determined by setting the variable to zero and one respectively while holding all other variables to zero.

For instance, if I had three variables the position for a single point would be computed as:

P` = (P00+t0(P10−P00)) + (P01+t1(P10−P01)) + (P02+t2(P12−P02))

where P0x and P1x are the postions of the point when tx = 0 and 1 respectively.

Obviously, I wish to contrain the solution to have values for the variables between [0,1].

I'd greatly appreciate any help in determining how to set up a solution to this problem. I really don't have much knowledge or experience with linear optimization problems. I just know it is one. At first I thought it might be a linear least−squares problem, but I couldn't figure out how to couch it in those terms. It seems as though it should be fairly straight−forward problem to solve, though.

Thanks in advance!

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    - *From:* Ray Koopman

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