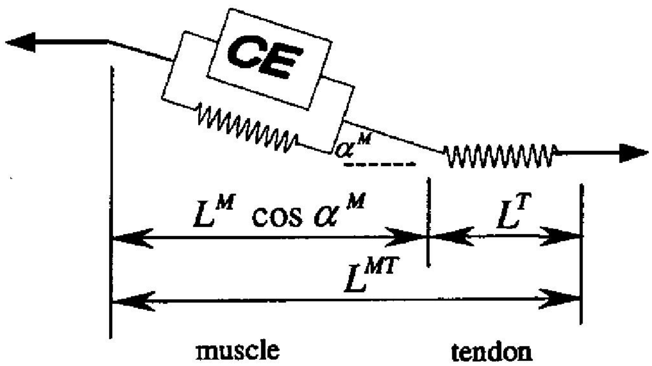

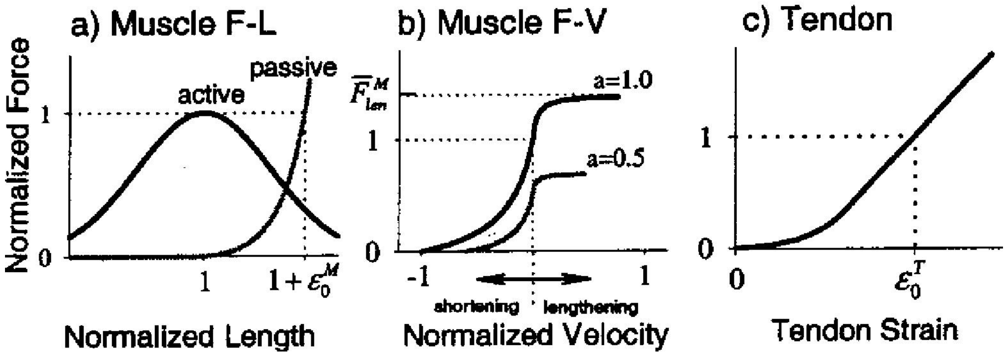

According to my understanding, static optimization uses the known kinematics of the model to find a set of muscle activations that satisfy this equation:

$$\sum_{m=1}^{n} a_m f(F_m^0, l_m, v_m) = \tau_j$$

While minimizing the cost function:

$$J = \sum_{m=1}^{n} (a_m)^p$$

Where l_m *and* v_m are length and contraction velocity of muscle **<u>contractile element</u>** (CE) respectively. These parameters are different from musculotendon length and contraction velocity.

In the first equation, τ_i is known from inverse dynamics. We have three sets of unknowns at each time step including muscle activations, muscle lengths (L^M in the picture) and muscle fiber velocities ($\dot{L}^M$). We know the total musculotendon length (L^{MT} in the picture) and velocity from kinematics of the linkage . I was wondering how can we estimate l_m *and* v_m from the kinematics data?