

TAM 674

Applied Multibody Dynamics

Spring Term 2003, Mon & Wed 10:10-11:00, 202 Thurston Hall, 3 credits.

Homework assignment 3

In deriving the equations of motion for the constraint multibody system we used the principle of virtual power together with the D'Alembert principle to include inertia forces. The constraints were added to the virtual power expression by means of the Lagrangian-multiplier method.

Now read Lanczos [1], Chapter II, Section 5, *Auxiliary conditions. The Lagrangian λ -method*, and Chapter III, Section 1, *The principle of virtual work for reversible displacements*, and address the following items.

- a. Use the same reasoning as shown on pages 45–46 to come to the equations of motion.
- b. Where did we use Postulate *A* from page 76?

Note that Lanczos speaks of virtual work whereas we have used the concept of virtual power. Either approach will work, of course my preference lies in the virtual power approach.

References

- [1] Lanczos, C., *The Variational Principles of Mechanics*, University of Toronto Press, Toronto, 1949.