



Apr 27th, 12:00 PM - 4:30 PM

## An Alterative Set of Constraints - The Theorems of the Alternative

Kathryn L. Balsman  
*Illinois Wesleyan University*

Melvyn Jeter, Faculty Advisor  
*Illinois Wesleyan University*

Follow this and additional works at: <https://digitalcommons.iwu.edu/jwprc>

---

Balsman, Kathryn L. and Jeter, Faculty Advisor, Melvyn, "An Alterative Set of Constraints - The Theorems of the Alternative" (1991). *John Wesley Powell Student Research Conference*. 41.

<https://digitalcommons.iwu.edu/jwprc/1991/posters/41>

This is protected by copyright and/or related rights. It has been brought to you by Digital Commons @ IWU with permission from the rights-holder(s). You are free to use this material in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/ or on the work itself. This material has been accepted for inclusion by faculty at Illinois Wesleyan University. For more information, please contact [digitalcommons@iwu.edu](mailto:digitalcommons@iwu.edu).

©Copyright is owned by the author of this document.

AN ALTERNATIVE SET OF CONSTRAINTS -  
THE THEOREMS OF THE ALTERNATIVE

Kathryn L. Balsman, Dept. of Mathematics, IWU, Dr. Melvyn Jeter\*

A typical Theorem of the Alternative shows that corresponding to any given system of linear constraints, system I, there is another associated system of linear constraints, system II, based on the same data, satisfying the property that one of the systems among I and II is feasible if and only if the other is infeasible. These theorems have direct applications in the derivations of optimality conditions. This project explores the Theorems of the Alternative as they are found in linear programming, projection theory, and linear complementarity. Farkas' Theorem, Gordan's Theorem, and Tucker's Theorem are considered in particular. In addition, this project investigates Pye and Webster's claim (1989) that each theorem can be easily proven using the geometric form of Gordan's Theorem of the Alternative with the proper subspaces.