

## CDS 270 (Fall 09) - Lecture 5 (Oct 16, 09)

Topics covered:

- semialgebraic sets
- S-procedure
- Generalized S-procedure
- Theorem of weak alternatives
- Positivstellensatz (S-procedure as a special case) and its interpretation

References:

- Boyd & Vandenberghe - section 5.8
- Pablo Parrilo's thesis (available at <http://www.mit.edu/~parrilo/pubs/files/thesis.pdf>)
- Sanjay Lall's lecture slides (available at <http://junction.stanford.edu/~lall/engr210b/>)
- A few nice applications to controls problems (with reasonable explanation of a procedure to obtain computationally verifiable conditions from straight application of Positivstellensatz) are in a paper available at [http://jagger.me.berkeley.edu/papers/weehong\\_2.pdf](http://jagger.me.berkeley.edu/papers/weehong_2.pdf)