Proof (Sketch): By PTV lemma we know that P is stabilizable iff

(a) Σ is stabilizable & detectable

(b) if $\tilde{\Sigma}_{12} = 0$, then $\tilde{\Sigma}_{12}$ is weakly complete.

(c) if $\check{\Sigma}_{21} = 0$, then $\check{\Sigma}_{21}$ is weakly complete.

(I) Show that (a) is equivalent to having P stabilizable & detectable.

Important fact used: Lifting preserves stabilizability & detectability.

(II) Show (b) is equivalent to (i) in Main Theorem.

(III) Show (c) is equivalent to (ii) in Main theorem.

The main idea is to use set switching pattern s s.t. no complementary subsystem of Σ is equal to zero.