

國立中山大學應用數學系

學術演講

講者：許瑞麟 教授
成功大學數學系

講題：S-Lemma with Equality and Its Applications

時間：2015/4/23 (星期四) 14:10 ~ 15:00

地點：理學院四樓理 SC 4011 室

茶會：15:00 於理 SC 4010 室 (系辦公室)

摘要

Let $f(x)=x^T A x+2a^T x+c$ and $h(x)=x^T B x+2b^T x+d$ be two quadratics having symmetric matrices A and B . The S-lemma with equality asks when the unsolvability of the system $f(x)<0, h(x)=0$ implies the existence of a real number μ such that $f(x) + \mu h(x) \geq 0, \forall x \in \mathbb{R}^n$. The problem is much harder than the inequality version which asserts that, under Slater condition, $f(x)<0, h(x) \leq 0$ is unsolvable if and only if $f(x) + \mu h(x) \geq 0, \forall x \in \mathbb{R}^n$ for some $\mu \geq 0$. By overcoming the difficulty that the equality $h(x)=0$ does not possess any Slater point and that both f and h may not be homogeneous, we show that the S-lemma with equality is always true unless the matrix A has exactly one negative eigenvalue; $h(x)$ is a non-constant linear function ($B=0, b \neq 0$); and one natural relation between A and b is met. As an application, we can globally solve $\inf\{f(x) \mid h(x)=0\}$ as well as the two-sided generalized trust region subproblem $\inf\{f(x) \mid l \leq h(x) \leq u\}$ without any assumption. Moreover, the convexity of the joint numerical range $(f(x), h(x))$ for f being nonhomogeneous and h linear can be characterized using the newly developed S-lemma with equality.

中山大學應用數學系

敬請公告！歡迎參加！

應用數學系：<http://math.nsysu.edu.tw>

校園地圖：<http://web.nsysu.edu.tw/files/11-1000-1503.php?Lang=zh-tw>

交通資訊：<http://www.nsysu.edu.tw/files/90-1000-7.php?Lang=zh-tw>



應用數學系



校園地圖



交通資訊