

課號 : 522 M3500  
類別 : 選修  
名稱 : 強韌控制  
英文名稱 : Robust Control  
學分 : 3  
適修年級 : 研究所  
課程大綱 :

1. Norms for signals and systems.
2. Uncertainty and robustness.
3. Design constraints.
4. Loop shaping.
5. Model matching.
6. Design for performance, stability, and robust performance.
7. Coprime factorization and uncertainty
8. Gap metric
9. LFT (linear fractional transformation) and loop shaping techniques.

預修課程 : 自動控制 (一) , 自動控制 (二) 或線性控制系統。

授課老師 : 王富正

課程說明 : Classical control techniques are introduced in Automatic Control I course, in which most analysis and synthesis tools are presented by transfer function methods. Then modern control techniques are introduced in Automatic Control II and Linear System Control courses, where the control problems are illustrated in state-space forms.

Because mathematical models are simplifications of physical systems, there will be some kinds of model variations or uncertainties in practice. Thus, to guarantee that the controllers designed by the simplified mathematical models can really work for the real physical systems, we need to study the philosophy of robust control. This course will introduce the fundamental ideas of robust control: defining the sizes (norms) of signals and systems, and then discussing system uncertainties, robust stability, and robust performance. Some techniques will be illustrated by transfer function methods to strengthen the understanding.

評分考試 : 期中考 50%, 期末報告 50%.

使用書籍 :

1. *Feedback Control Theory*, by J.C. Doyle, B.A. Francis and A.R. Tannenbaum.  
Downloadable from: <http://www.control.utoronto.ca/people/profs/francis/dft.html>
2. *Essentials of Robust Control*, by K. Zhou and J.C. Doyle. Prentice Hall. 1998.
3. *Linear Robust Control*, by M. Green and D.J.N. Limebeer. Prentice Hall. 1995.
4. *Robust and Optimal Control*, by K. Zhou, J.C. Doyle and K. Glover. Prentice-Hall. 1996.

注意事項 :