Guidance of Missiles - Web course

COURSE OUTLINE

This course covers the basic of missile guidance theory and its applications to tactical missiles.

The classical to modern developments in missile guidance is covered using both an empirical approach (which is standard in teaching classical guidance laws) and then a control theoretic approach (which would deal mainly with modern guidance laws and its linkages with the classical laws).

This is a aerospace applications course that covers an important application of control theory to guided missiles, and will be suitable for senior undergraduate and graduate students, as well as scientists/engineers/researchers in the area of missile guidance.

COURSE DETAIL

Module	Topic	No of hrs
1	History of guided missiles; Category of guided missiles for air defence.	2
2	Major components of guided missiles.	4
3	Fundamentals of guidance.	2
4	Basic results in interception and avoidance.	2
5	Capturability in relative velocity space.	2
6	Taxonomy of guidance laws.	2
7	Command and homing guidance.	2
8	Classical guidance laws - Pursuit, Line-of-Sight, Command to Line-of-Sight, Beam Rider, Constant Bearing guidance laws.	6
9	Proportional Navigation (PN) and its variants like T (True) PN, P (Pure) PN, B (Biased) PN, G (Generalized) PN, and I (Ideal) PN.	6
10	Modern Guidance laws - Optimal control based	4

NP-TEL

NPTEL

http://nptel.iitm.ac.in

Aerospace Engineering

Pre-requisites:

1. It would help if the students have an exposure to control theory and flight mechanics at the undergraduate level.
2. However, this is not absolutely necessary as the course is selfcontained and is designed to cater to both aerospace and non-aerospace engineers.

Additional Reading:

1. N.A. Shneydor: Missile Guidance and Pursuit: Kinematics, Dynamics and Control, Ellis Horwood Publishers, 1998.
2. R. Yanushevsky: Modern Missile Guidance, CRC Press, 2008.

Coordinators:

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	guidance laws, Linear formulations.	
11	Non-linear formulations; Two point boundary value problems.	2
12	Approximations and closed-form solutions; Equivalence with PN guidance laws.	3
13	Numerical solutions for guidance problems.	3
	TOTAL	40

References:

1. P. Zarchan: Tactical and Strategic Missile Guidance, AIAA, 2007.
2. G.M. Siouris: Missile Guidance and Control Systems, Springer Verlag, 2004.