Lista zagadnień na egzamin dyplomowy

Kierunek studiów:	**Automatyka i Robotyka** Stopień studiów: **drugi**
Specjalność:	**Smart Aerospace and Autonomous Systems (Inteligentne systemy latające i systemy autonomiczne**

Nr	Zagadnienie
1	Basic tools used in design of nonlinear control algorithms. **[Nonlinear systems]**
2	Different linearization methods. **[Nonlinear systems]**
3	Examples of linearization techniques. **[Nonlinear systems]**
4	Characterization of autonomous systems. Control architecture paradigms in mobile robotics. **[Fundamentals of autonomous systems]**
5	Basic structures and properties of wheeled robots. **[Fundamentals of autonomous systems]**
6	Motion control of wheeled mobile robots. **[Fundamentals of autonomous systems]**
7	Adaptive control with a reference model (MRAC). **[Adaptive control]**
8	Adaptive control with plant-model identification (MIAC). **[Adaptive control]**
9	Adaptive control with active disturbance rejection (ADRC). **[Adaptive control]**
10	Learning algorithms for Artificial Neural Networks. **[Basics of smart systems]**
11	Radial basis function networks. **[Basics of smart systems]**
12	Fuzzy inference systems. **[Basics of smart systems]**
13	Multi-agent systems characteristics; MAS applications. **[Design of multi-agent systems]**
14	Multi-agent techniques in mobile robotics. **[Design of multi-agent systems]**
15	Communication in multi-agent systems. **[Design of multi-agent systems]**
16	Optimal controllers. **[Control of under-actuated systems]**
17	Linearisation and partial feedback linearisation for acrobot and pole-cart. **[Control of under-actuated systems]**
18	Energy shaping control for pendulum and cart-pole. **[Control of under-actuated systems]**
19	Mathematical model of aircraft. **[Design of control systems]**
20	Linear and nonlinear controllers for aerial vehicle. **[Design of control systems]**
21	Controller design for mobile robots with respect of dynamics models. **[Design of control systems]**
22	Vision system in control systems. Types of vision based control. Camera calibration. **[Vision based control]**
23	Basics of image processing and analysis. **[Vision based control]**
24	Civil applications of Remotely Piloted Aircraft (drones). Types of drones. **[Aerial robots]**
25	The Aerial Robot Loop (components, description). **[Aerial robots]**
26	Control techniques of drones (classical, optimal control, robust control, nonlinear control, intelligent control). **[Aerial robots]**
27	Characteristics of white Gaussian noise. **[Sensor integration]**
28	Assumptions and operations of Kalman Filter. **[Sensor integration]**
29	Linearization method in Extended Kalman Filter. **[Sensor integration]**
30	Combinatorial and sampling planning methods. **[Navigation and motion planning in robotics]**
31	Geometric and kinodynamic planning. Planning in view of the optimal control paradigm. **[Navigation and motion planning in robotics]**
32	Environment description methods for motion planning purposes. **[Navigation and motion planning in robotics]**
33	Differential flatness systems and their methods of control. **[Nonlinear control systems]**
34	Examples of differential flatness systems. **[Nonlinear control systems]**
35	Systems described on Lie groups and their control and related examples. **[Nonlinear control systems]**
36	Methods of describing position and orientation in three-dimensional space. **[Control of flying robots]**
37	Limitations on the use of inverse dynamics methods in the control of flying robots. **[Control of flying robots]**
38	Methods of obtaining state variables inaccessible directly from sensors. **[Control of flying robots]**
39	Basic properties and characteristics of electronic systems of flying vehicles. **[Electronic systems of flying vehicles]**
40	Fundamentals of metrology and basic knowledge of general navigation and flight planning. **[Flight planning]**