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Undergraduate Research Program	
Project Name	Development of effective control strategies for real implementation
Campus & Location in Mexico	Monterrey
Faculty	Engineering
Research Area	Robotics
Research Responsible	Carlos Gustavo Sotelo Molina
Description of the Project	<p>Model Predictive Control (MPC) and advanced control strategies for linear systems are now a well-established discipline providing stability, feasibility, and robustness. Due to its inherent ability to take into account constraints and deal with multi-input multi-output variables. However, their high online computational load poses a challenge for practical real-time application in systems with fast dynamics. For that reason, the present proposal contemplates a research work that will lead us the development of a theoretical platform of new advanced control strategies for multivariable processes based on hybrid predictive adaptive controllers, which could be embedded in a wide range of applications, including chemical processes, industrial systems, energy, health, environment, aerospace, and aeronautical scenarios. This, considering time-varying processes affected by delays, linear and non-linear interaction between variables, effects of discrete events of known and unknown disturbances.</p> <p>Along the project you will be continuously advised by us to empower your knowledge and to achieve the following goals in one year:</p> <ul style="list-style-type: none"> a) Establish at least 2 Master Thesis Proposals. b) Encourage the relation with the group of students from Tec de Monterrey (VantTec for Unmanned Autonomous Vehicles, Space Makers for space innovation, etc.) c) Publication of 1 article articles in indexed journals (IET Control Theory and Applications, International Journal of Adaptive Control and Signal Processing, Computers and Chemical Engineering, AiCHE, etc.) d) Submission of 2 articles in indexed journals (IET Control Theory and Applications, International Journal of Adaptive Control and Signal Processing, Computers and Chemical Engineering, AiCHE, etc.) e) Submission of 2 international conference (SAFEPROCESS, IFAC World Congress, American Control Conference, European Control Conference, IEEE SysTol, etc.) <p>Remark: There exists a work plan that has already been tested. During the first weeks you will take lectures, sessions, labs, etc. which are essential to understand the basis of Model Predictive Control, Nonlinear Control, Modern Control Engineering, etc. If you any doubt do not hesitate to contact us via email as soon as possible. We can arrange a meeting and share you the results achieved. It will be a great industrial and research experience.</p>
Training Provided	Article publication; Teamwork; Writing and reading of essays / articles
Modality	Hybrid
Offered During	Summer (5 weeks); Winter (5 weeks); Semester

Student	
Tasks/Responsibilities	During the first weeks you will take lectures, sessions, labs, etc. which are essential to understand the basis of Model Predictive Control.
Required Language Proficiency	Spanish (Basic);Spanish (Medium);Spanish (Advanced);English (Basic);English (Medium);English
Required Skills and Abilities	Research and Teamwork.
Other Documents Required to APPLY for an Internship	<ol style="list-style-type: none"> 1) Being at least in your 2nd year of bachelor 2) Accumulative grade point average (GPA) 2.5 3) Official Transcript 4) 2 letters of recommendation of faculty members 5) Resume 6) Letter of intention explaining the reason why you would like to participate in the research program