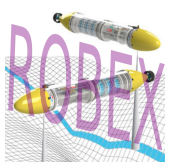
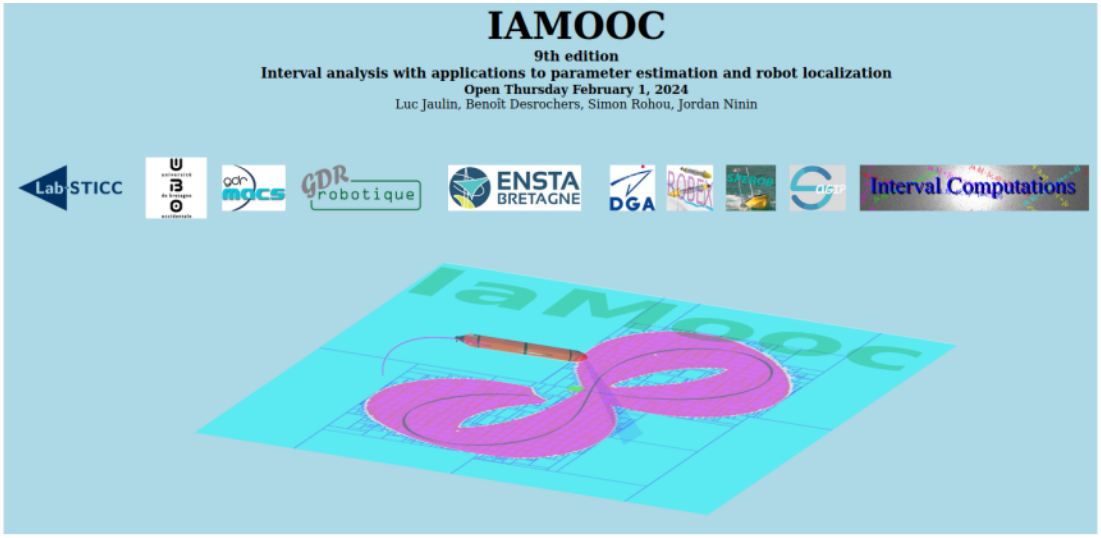
RobMOOC pour l'enseignement à distance de la commande non linéaire des robots mobiles

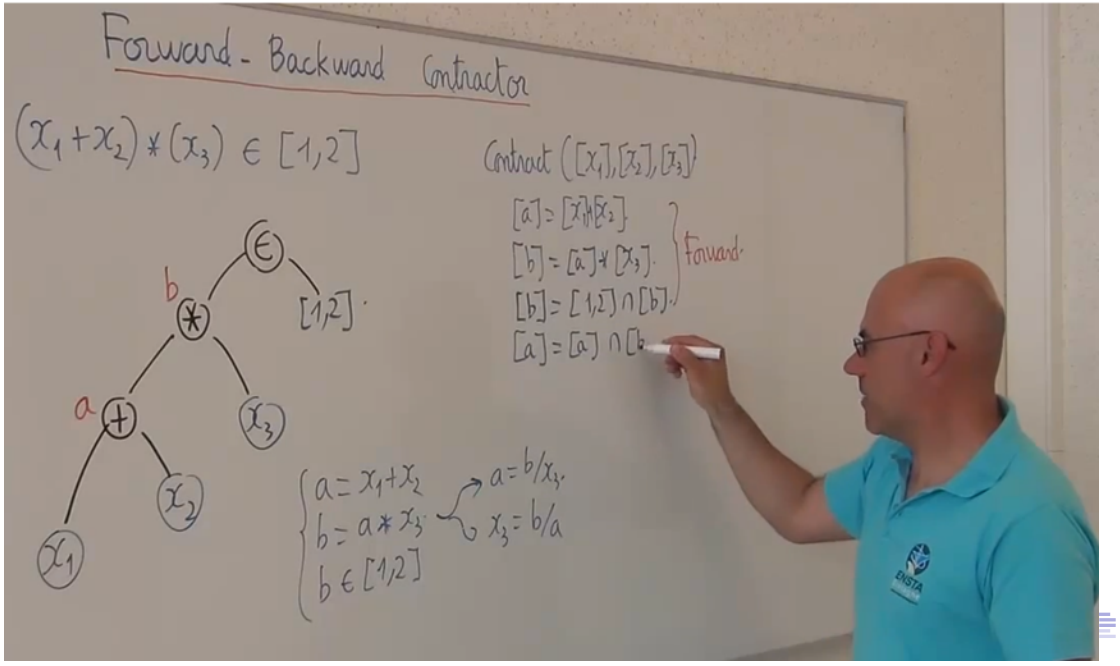
Luc Jaulin



4 juillet 2024, Enseignement Distanciel de la Robotique

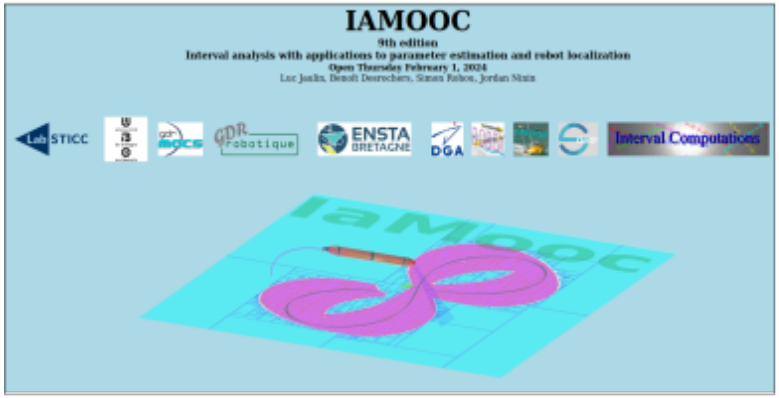
1. Présentation


IAMOOC
9th edition
Interval analysis with applications to parameter estimation and robot localization
Open Thursday February 1, 2024
Luc Jaulin, Benoît Desrochers, Simon Rohou, Jordan Ninin
Lab-STICC
ENSTA BRETAGNE
DGA
Interval Computations
IaMooc


Forward - Backward Contractor
$(x_1+x_2)*(x_3) \in [1,2]$
Contract $([x_1],[x_2],[x_3])$
$[a]=[x_1]+[x_2]$
$[b]=[a]*[x_3]$
Forward
$[b]=[1,2]\cap[b]$
$[a]=[a]\cap[b]$
$\begin{cases} a=x_1+x_2 \\ b=a*x_3 \\ b\in[1,2] \end{cases}$
$a=b/x_3$
$x_3=b/a$


AutoMOOC
4th edition
Automation MOOC, Linear Control with a State Space approach
Open Thursday February 1, 2024
Until Thursday March 21
Luc Jaulin
STICC
ENSTA BRETAGNE
GDR Robotique
DGA
AutoMOOC


KalMOOC
Un MOOC sur le filtre de Kalman
Ouverture de la 8ème édition : Jeudi 12 Octobre 2023
Luc Jaulin, ENSTA-Bretagne, UBO, Lab-STICC
jaulin.kalmooc@gmail.com
STICC
ENSTA BRETAGNE
GDR Robotique
DGA
Kal MOOC


IAMOOC
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Interval analysis with applications to parameter estimation and robot localization
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Luc Jaulin, Benoit Desrochers, Simon Rohou, Jordan Ninin
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Interval Computations
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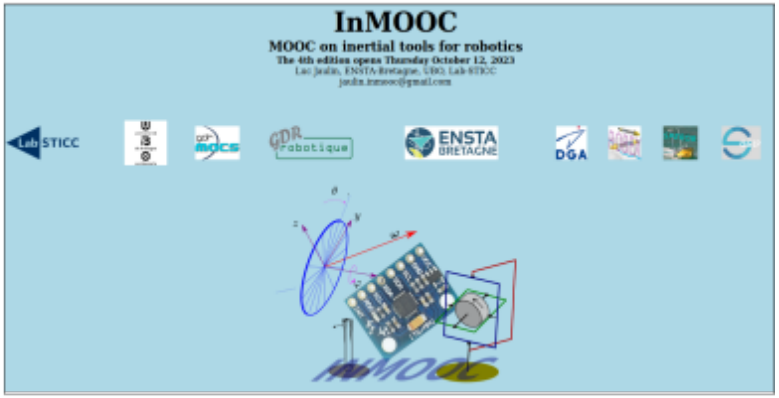
InMOOC
MOOC on inertial tools for robotics
The 4th edition opens Thursday October 12, 2023
Luc Jaulin, ENSTA-Bretagne, UBO, Lab-STICC
jaulin.inmooc@gmail.com
STICC
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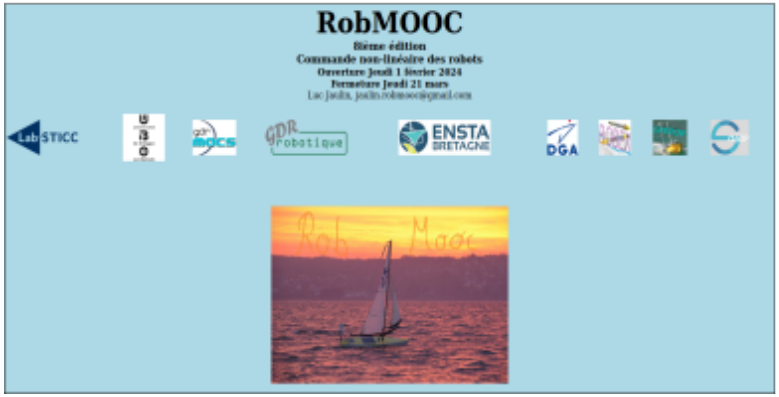
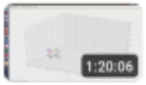
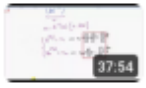
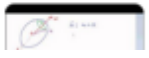
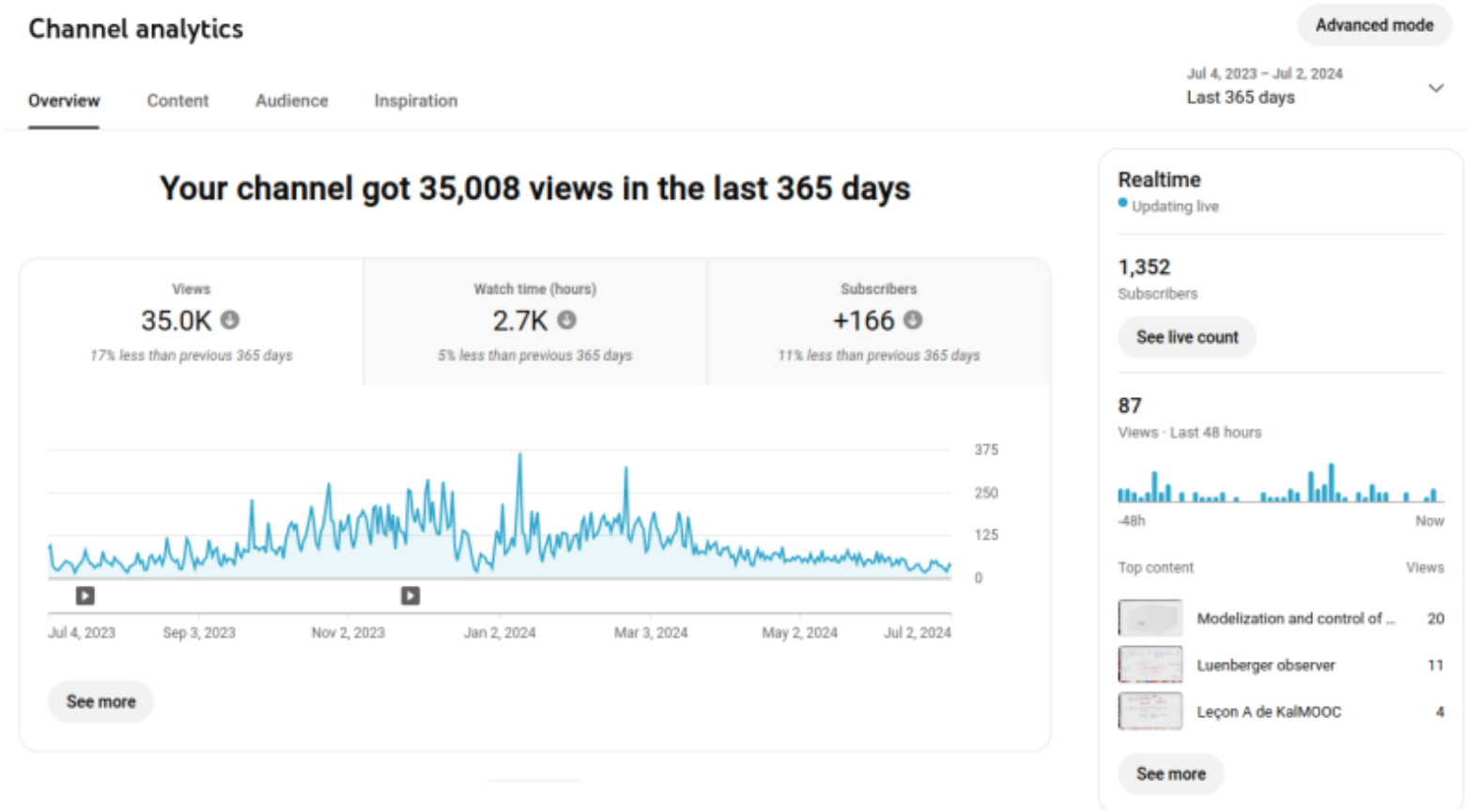

RobMOOC
8ème édition
Commande non-linéaire des robots
Ouverture Jeudi 1 février 2024
Fermeture Jeudi 21 mars
Luc Jaulin, jaulin.robmooc@gmail.com
STICC
ENSTA BRETAGNE
GDR Robotique
DGA
Rob Mooc


Présentation
Enseignants
Semestre 3
Semestre 4
Semestre 5
Semestre 6
Galerie
Spécialité
Robotique Autonome

 1:20:06	Modelization and control of a quadrotor We find the state equations of a quadrotor and then we propose a controller so that the quadrotor is stable and moves along a cycle...	Public	None	Apr 3, 2018 Published	12,624	12
 23:51	Luenberger observer This exercise shows how to get a Luenberger observer on a simple second order system https://www.ensta-bretagne.fr/automooc/	Public	None	Mar 31, 2020 Published	9,397	4
 16:48	Kalmooc, Exercice 34 : règle de Bayes et filtre de Kalman On utilise ici la règle de Bayes à travers le filtre de Kalman dans un contexte scalaire, linéaire et Gaussien https://www.ensta-bretagne.fr/...	Public	None	Nov 25, 2017 Published	8,079	1
 49:34	Kalmooc, Exercice 26 : kalman pendule inversé Observateur d'état pour le pendule inversé https://www.ensta-bretagne.fr/jaulin/isterob.html https://www.ensta-bretagne.fr/kalmooc/	Public	None	Dec 2, 2014 Published	6,274	6
 30:45	Leçon A de KalMOOC Leçon A de KalMOOC https://www.ensta-bretagne.fr/kalmooc/	Public	None	Sep 3, 2016 Published	5,727	0
 37:54	robmoocB : bouclage linéarisant Leçon B. Commande par bouclage linéarisant, singularités et modes glissants Résumé. La leçon B, présentera d'une façon plus générale...	Public	None	Jan 2, 2016 Published	4,918	1
 47:23	robmoocA : Intro Leçon A. Introduction au bouclage linéarisant. Résumé. Dans cette leçon A, nous présenterons la problématique de la commande non-linéaire de...	Public	None	Dec 30, 2015 Published	4,986	7
	InMooc, Exercise 3 : formule de Varignon Formule de Varignon, matrice de rotation See the MOOC associated with	Public	None	Sep 15, 2014 Published	4,693	2


Channel analytics
Advanced mode
Overview
Content
Audience
Inspiration
Jul 4, 2023 – Jul 2, 2024
Last 365 days
Your channel got 35,008 views in the last 365 days
Views
35.0K
17% less than previous 365 days
Watch time (hours)
2.7K
5% less than previous 365 days
Subscribers
+166
11% less than previous 365 days
375
250
125
0
Jul 4, 2023
Sep 3, 2023
Nov 2, 2023
Jan 2, 2024
Mar 3, 2024
May 2, 2024
Jul 2, 2024
See more
Realtime
Updating live
1,352
Subscribers
See live count
87
Views · Last 48 hours
-48h
Now
Top content
Views
Modelization and control of ...
20
Luenberger observer
11
Leçon A de KalMOOC
4
See more

https://www.ensta-bretagne.fr/robmooc/

2. Un minicours : la chaîne d'intégrateurs

$$y^{(n)} = u$$

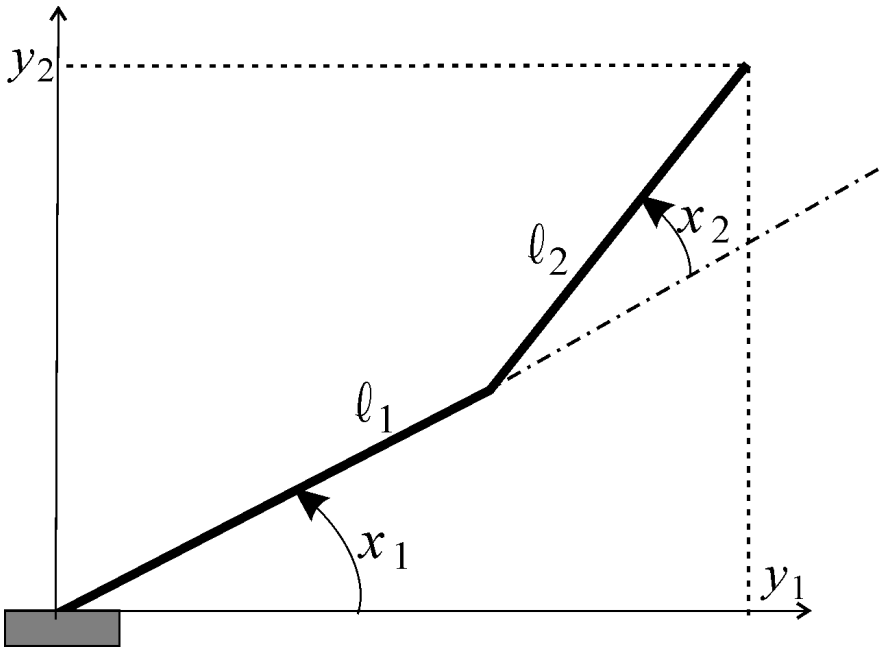
3. Un exercice : la manivelle

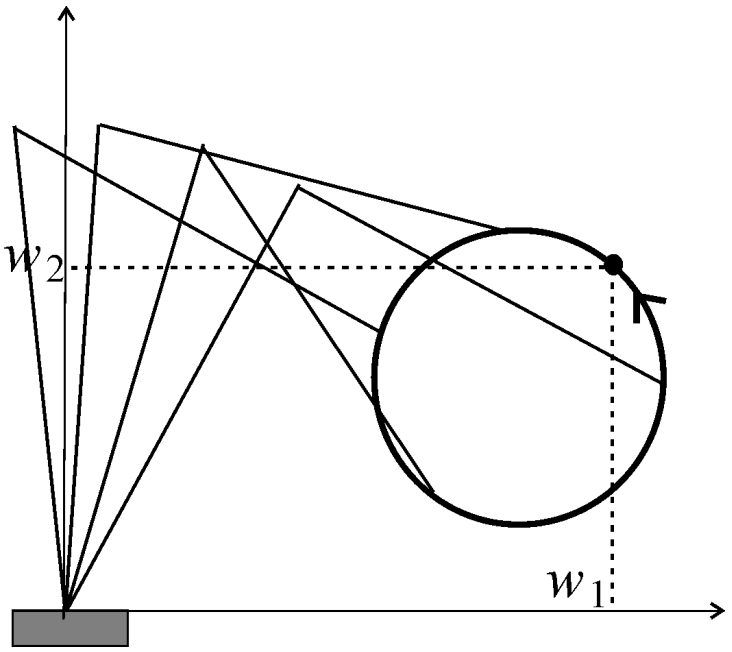
Exercise 1. Let us consider the manipulator robot composed of two arms of length ℓ_1 and ℓ_2. Its two degrees of freedom denoted by x_1 and x_2. The inputs u_1, u_2 of are the angular speeds of the arms $(u_1 = \dot{x}_1, u_2 = \dot{x}_2)$. The output vector $\mathbf{y} = (y_1, y_2)$ corresponds to the end of the second arm.

1) Give the state equations of the robot. We take the state vector $\mathbf{x} = (x_1, x_2)$.

2) Give a control law so that $\mathbf{y}$ to follow the setpoint

$$\mathbf{w} = \mathbf{c} + r \cdot \begin{pmatrix} \cos t \\ \sin t \end{pmatrix}.$$





3) Study the singularities of the control.
4) Write a program illustrating this control law.

References

1. Robmooc [2]
2. La robotique mobile [1]


L. Jaulin.
Mobile Robotics.
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L. Jaulin.
RobMOOC, un MOOC sur la commande non-linéaire des robots mobiles , `www.ensta-bretagne.fr/robmooc/`.
ENSTA-Bretagne, 2019.