



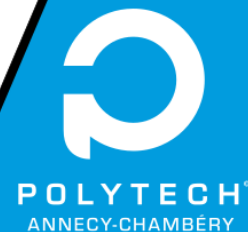
メカトロニクスの日本とフランス週間

JFWM 2025

JAPANESE FRENCH WEEK ON MECHATRONICS

2025.09.16^{TUE} - 24^{WED}
@ ANNECY, FRANCE

Supports:





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6th edition of JFWM





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Program

- Lectures
- Tutorials



Prof. Hideyuki Sawada

Waseda University, JP
School of Advanced Science and Engineering



Prof. Yuji Suzuki

Special Advisor to Dean, School of Engineering
The University of Tokyo, JP
Department of Mechanical Engineering



Dr. Takayuki Fujita

Associate Professor
University of Hyogo, JP
Graduate School of Engineering



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Program

- One day conference : Industry & AI: Keys to Success

NTN



PFEIFFER
VACUUM+FAB SOLUTIONS



在リヨン領事事務所





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Program

- Mechatronics Challenge
- **6 TEAMS** of mixed of international students



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Program



- Pilot industrial site visit (Friday 19)
(FISA + Japanese students)





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Challenge

WIND IT UP

Fabien Formosa – Professor, Polytech Anancy Chambéry

Luc Marechal – Assistant Professor, Polytech Anancy Chambéry

David Gibus – Assistant Professor, Polytech Anancy Chambéry

Blaise Girard – Mechanical Technician, Polytech Anancy Chambéry



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Challenge brief

**This year
challenge aims at
the design
and
implementation
of a winch to
wind up 10 m
of rope**



**WIND
IT UP**



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Supports:



Groups

ALLOCATED group letters and students names

	A B C							
09:00								
09:15	Coffee 9:00 - Main Hall Polytech							
09:30								
09:45	Opening - 9:45-10:00 - A. Badel - B014							
10:00	Presentation: Program & "Challenge" - 10:00-10:15							
10:15	90' Lecture 10:15 - 11:45 Y. Suzuki, University of Tokyo Design of broadband vibration energy harvesting device B014		90' Lecture 10:00 - 11:30 T. Fujita, University of Hyogo, JP IoT modules & its tutorial by using SBC B014					
10:30								
10:45								
11:00								
11:15								
11:30								
11:45	Lunch break							
12:00	11:45-13:15							
13:15								
13:30	Challenge: Start 13:15 - 14:45 Groups : A, B	90' Tutorial - 13:15 - 14:45	90' Tutorial - 13:15 - 14:45	90' Practical work	Challenge 13:15 - 14:45 Group : C			
13:45		Y. Suzuki	Y. Suzuki	13:15 - 14:45				
14:00		Design of broadband vibration	Design of broadband vibration	T. Fujita				
14:15		energy harvesting device	energy harvesting device	IoT modules tutorial using SBC				
14:30		C114 - Group : C	C114 - Group : B	C213 - Group : A				
14:45								
15:00								
15:15	90' Tutorial - 15:00 - 16:30	Challenge: Start 15:00 - 16:30 Groups : C, D	Challenge 15:00 - 16:30 Groups : A, B, C		90' Practical work			
15:30	Y. Suzuki				15:00 - 16:30			
15:45	Design of broadband vibration				T. Fujita			
16:00	energy harvesting device				IoT modules tutorial using			
16:15	C114 - Group : A				SBC			
16:30					C213 - Group : C			



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Timeline

- 11 time slots of 90'
- Wednesday September, 24 Final demonstration

A jury will discuss and define which is the best accomplishment

(achievement of goals + demonstration + teamwork)





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AIMS

- **Design and implement a transmission system** between a DC motor and a reel.
- **Design and implement a pivot joint** to mount the reel on the given axe.
- **Develop Arduino code** to automatically start the winch and stop it when only 50 cm of rope remains.
- **Enable remote control of the winch** via a smartphone.
- **Display the real-time rope length** on the smartphone.



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Your system

Reach the helicopter !





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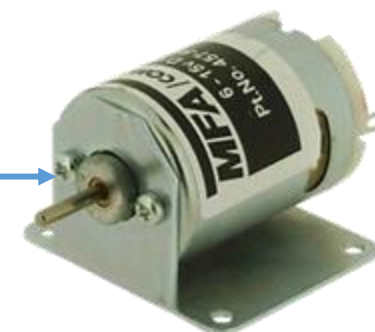
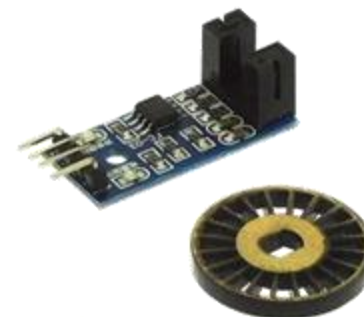
Supports:



Available material and tools

→ Mechanics and Electronics

- 1 reel
- 2 ball bearings
- 1 rotary sensor
- 1 Arduino board
- 1 xiao BLE board
- 1 DC motor + pulley
- A set of timing belts
- Screws



→ Software and Fabrication

- Software: Solidworks, Simcenter 2404, Arduino IDE
- ABS 3D printers



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Constraints

No glue ! No duct tape ! No cardboard ! No blu tack !



If you use it :





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Constraints

- ➔ Max DC motor voltage: 11 V
- ➔ All the 3D prints of parts will be done by Polytech
- ➔ Only 3 attempts to be qualified will be performed on Tuesday the 23^d
- ➔ Only one prototype per team

Expectations

1. The system is to be assembled (and disassembly) as fast as possible
2. The fastest and most precise winding is kept and challenged by the other teams (each of the prototypes will be confronted with an opponent to defined the best of all)
3. The design relies on a theoretical based model
4. Use the less plastic material as possible (each prototype will be weighted)
5. Project management and task sharing. Teamwork.



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Supports:



Technical data – timing belt

Détermination de la longueur de courroie

D1 = Diamètre primitif de la grande poulie

D2 = Diamètre primitif de la petite poulie

A = Entraxe

L = Longueur totale de la courroie

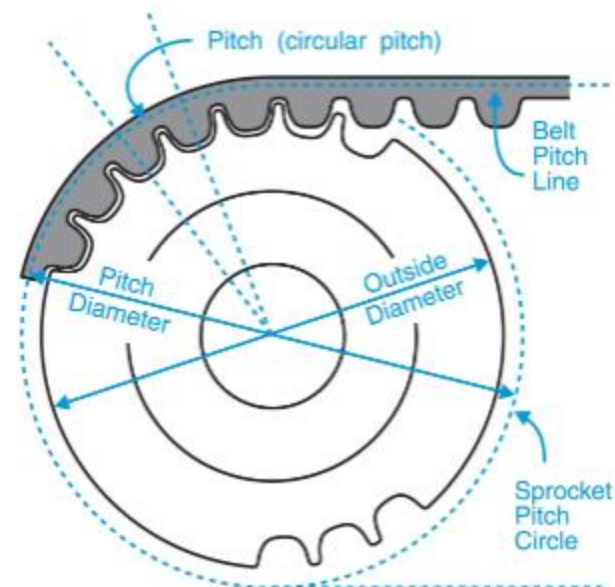
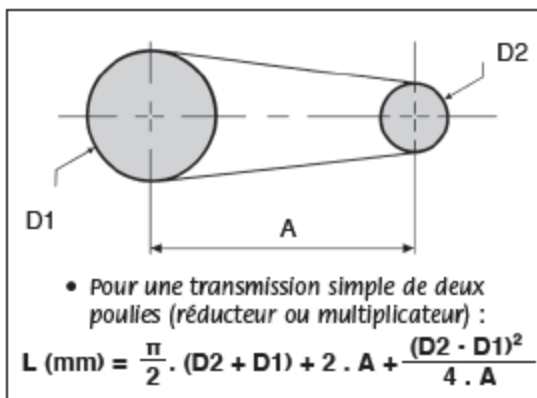
Z1 & Z2 = Nb dents

P = Pas

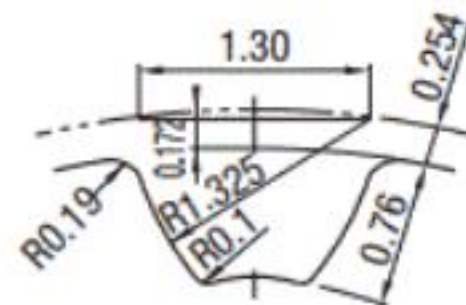
$$D1 = \frac{Z1 \cdot P}{\pi}$$

$$D2 = \frac{Z2 \cdot P}{\pi}$$

$$\text{Nb. de dents} = \frac{L}{P}$$



Standard Tooth Profile



Tooth groove dimensions slightly change according to No. of teeth.

(Pitch: 2.0mm)



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Caractéristiques:

- Alimentation: 6 à 15 Vcc
- Consommation:
 - 0,16 A à vide (12 Vcc)
 - 0,84 A en charge (12 Vcc)
- Vitesse de rotation:
 - 11000 t/min à vide (12 Vcc)
 - 9280 t/min en charge (12 Vcc)
- Couple en charge: 65 g.cm (12 Vcc)
- Couple bloqué: 418 g.cm (12 Vcc)
- Diamètre du moteur: 28 mm
- Diamètre de l'axe: 2,3 mm (sans méplat)



Technical data – DC motor

DC motor equations

$$U = E + Ri + L \frac{di}{dt}$$

$$E = k \Omega$$

$$C_m - C_r - f \Omega = J \frac{d\Omega}{dt}$$

$$C_m = k i$$

MFA RE385 key parameters

$$k = 0.00985531 \text{ V}/(\text{rad/s})$$

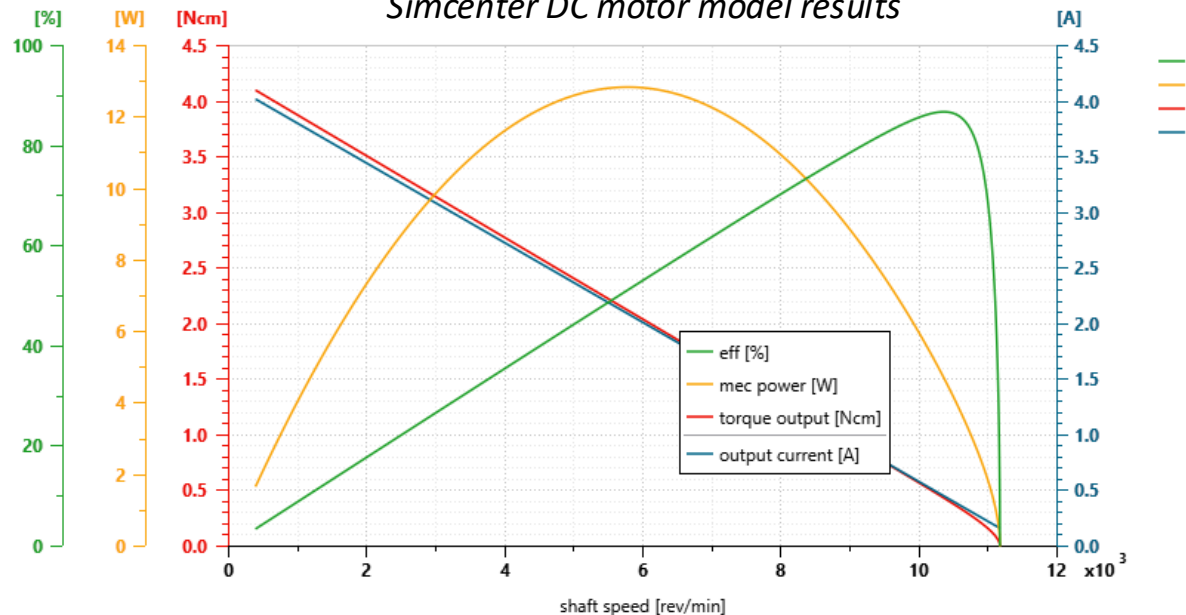
$$R = 2.88 \Omega$$

$$L = 12 \text{ mH}$$

$$f = 1.37 \cdot 10^{-6} \text{ Nm}/(\text{rad/s})$$

$$J = 12,3 \text{ kg mm}^2$$

Simcenter DC motor model results





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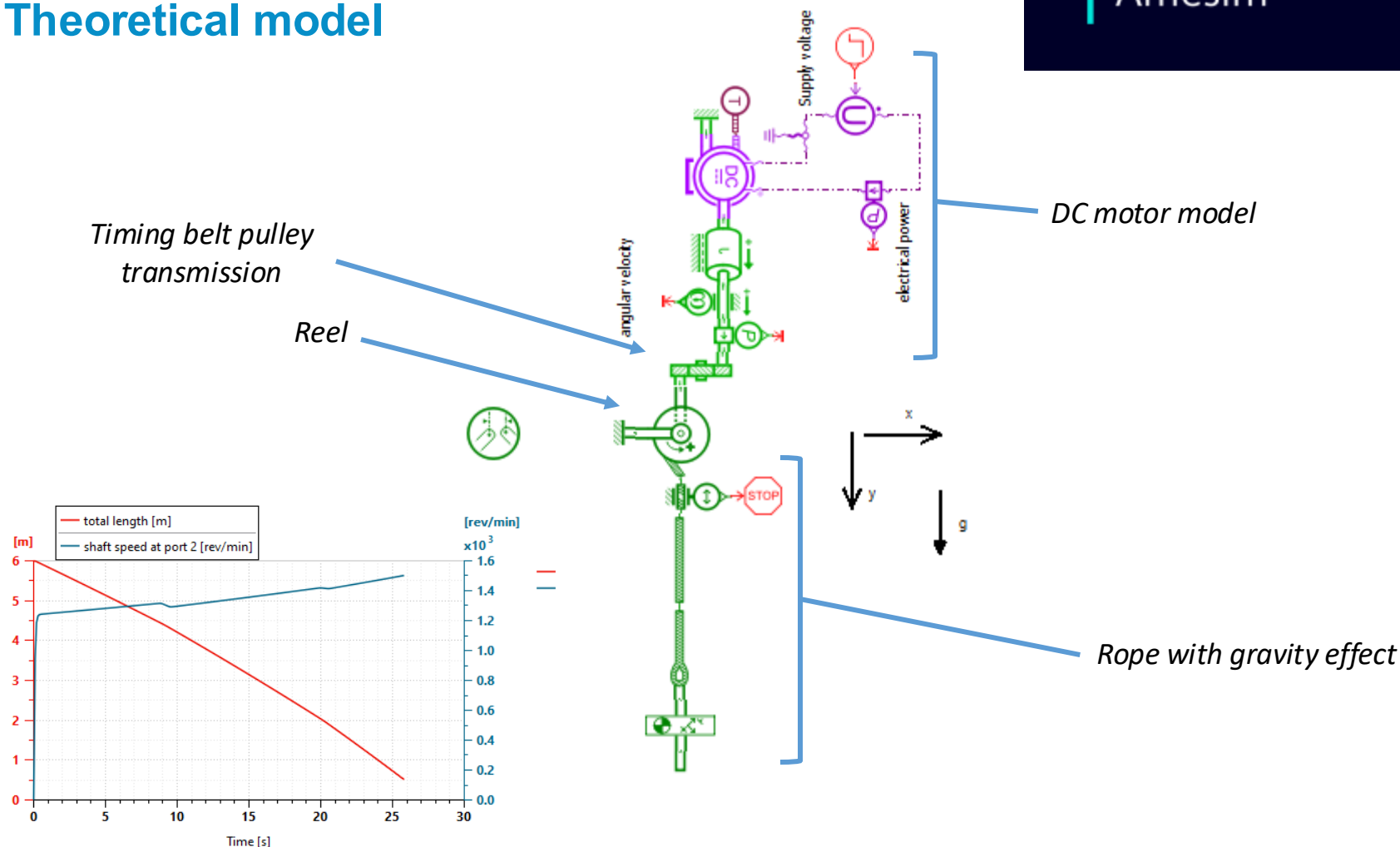
SIEMENS

DIGITAL INDUSTRIES SOFTWARE

Simcenter

Amesim

Theoretical model





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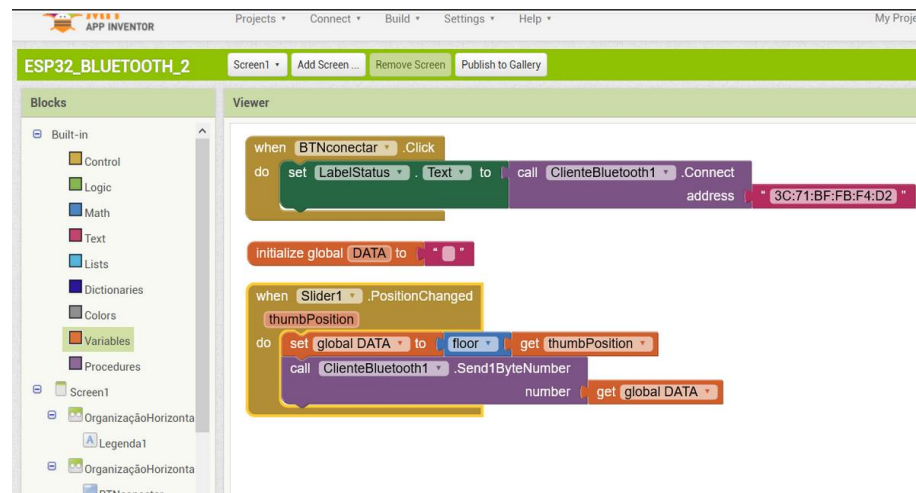


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Interface through cell phone via BLE

- Set up the Bluetooth communication between a cell phone and a Xiao BLE microcontroller
- Code an App with MIT APP Inventor2
- Display the sensor measurement on a phone





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Resources on the Github repo

Platform Solutions Resources Open Source Enterprise Pricing

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About

JAPANESE FRENCH WEEK ON MECHATRONICS 2025

Readme Activity 0 stars 1 watching 0 forks Report repository

Releases

No releases published

Packages

No packages published

LucMarechal Delete JFWM2025_Groups.pdf 6b49089 · last week 16 Commits

JFWM2025_Program.pdf	Add files via upload	last week
JFWM2025_Program.xlsx	Add files via upload	last week
README.md	Update README.md	5 months ago

README

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Industrial site visit

- We will visit PILOT on Friday afternoon



Safety shoes are **mandatory**

Answer the survey **now** to ask
for shoes. You will get them
on Friday morning





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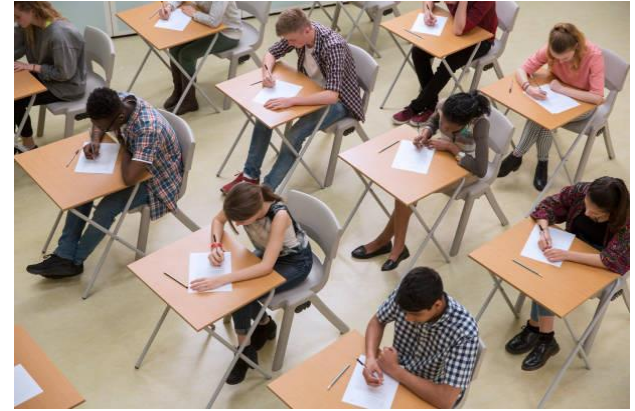
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Exam



- You will be evaluated by a final exam wednesday 24th
- It will be related to :
 - The Challenge
 - The lectures and tutorials done by Japanese professors
 - The Monday conference and roundtable

Wednesday Sept 24

EXAM
9:00 - 10:00
B104

Mechatronics Challenge
Presentations, Jury deliberations & awards
10:00 - 11:30
B104

JFWM 2024 Farewell Drink
11:30 - 13:30
Main Hall Polytech



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Attendance is mandatory all the week

- Master students : sign on papers
- Apprentices : sign on **NetyPareo**

Authentication

Identifiant

Se connecter

[Mot de passe oublié ?](#)



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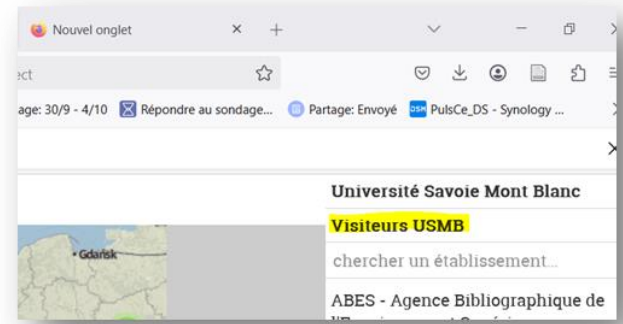
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Wifi



For Japanese students, you can access to wifi

- Connect to *Eduspot* + connect as *Visiteurs USMB* in the web browser with codes



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Day trip Saturday 20



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Day trip Saturday



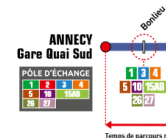
- 9:29 Bus stop « Vignière »
- 9:50 Talloires

Bus line 20



Gare d'Annecy / Vignières
 → Talloires-Montmin Angon

Du lundi au samedi, hors été



GARE QUAI SUD	05:35	06:05	06:23		07:39	08:10	08:45		09:51	
Bontieu	05:36	06:06	06:24		07:40	08:12	08:47		09:52	
Parmelan	05:38	06:08	06:26		07:43	08:14	08:49		09:55	
VIGNIÈRES	05:44	06:14	06:32	07:10	07:49	08:21	08:56	09:29	10:01	10:3
Petit Port Chavoires	05:47	06:17	06:35	07:15	07:53	08:25	09:00	09:33	10:05	10:3
Chavoires	05:49	06:19	06:37	07:17	07:55	08:27	09:02	09:35	10:07	10:3
Chef Lieu Veyrier	05:51	06:21	06:39	07:19	07:58	08:30	09:05	09:38	10:10	10:4
Montpellaz	05:54	06:24	06:43	07:23	08:01	08:34	09:09	09:42	10:14	10:4
Chef Lieu Menthon	05:57	06:27	06:46	07:26	08:04	08:37	09:12	09:45	10:17	10:4
Les Granges	06:02	06:32	06:51	07:31	08:09	08:42	09:17	09:50	10:22	10:5
Angon	06:08	06:38	06:58	07:37	08:15	08:48	09:23	09:56	10:28	10:5
TALLOIRES-MONTMIN ANGON	06:10	06:40	07:00	07:39	08:17	08:50	09:25	09:58	10:30	11:0



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Day trip Saturday

- Hike at

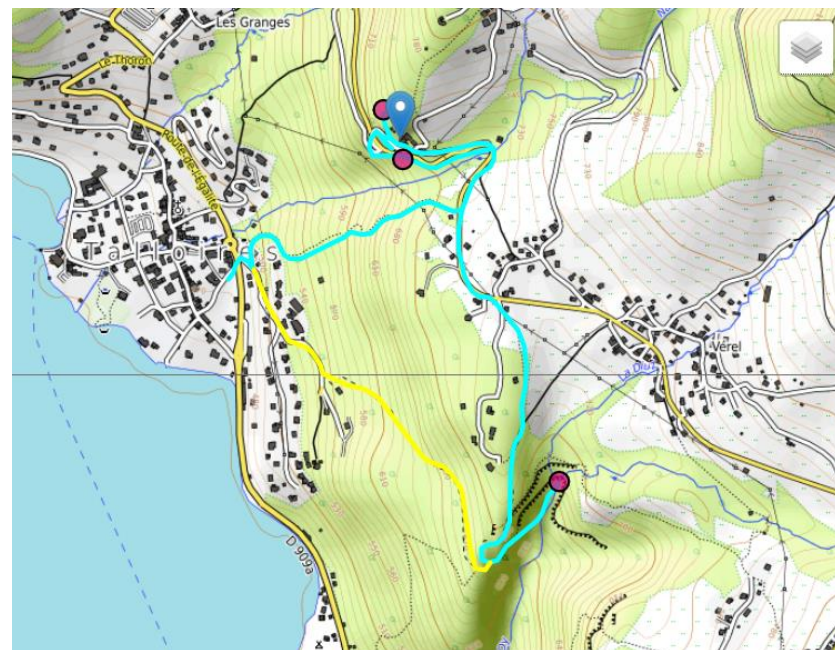
Hermitage Saint-Germain and Angon Waterfall

about 2h walk. **Take hiking shoes**



- Snack lunch at Talloires beach
- Return by bus

- French students are welcome !
- Infos will be sent by email





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Have Fun !

Groups

GROUP A				TEAM
PHILIPPE	Nicolas	MAM2	FRA	A1
ENATSU	Koichi	Tokyo	JPN	
TAKAGI	Yukihiro	Waseda	JPN	
CRIADO	Romain	FISA5	FRA	
GHERBI	Choayb	FISA5	FRA	
VALLIER	Lucillien	FISA5	FRA	
REY	Dimitri	FISA5	FRA	

DJERABE	Gauthier	MAM2	FRA	A2
WANG	Koichi	Tokyo	CHN	
TODA	Ittetsu	Waseda	JPN	
SHIOKAWA	Yuma	Waseda	JPN	
GUIA	Nicolas	FISA5	FRA	
ANANI	Nawel	FISA5	FRA	
BERNIER	Théo	FISA5	FRA	
MIRET	Thibault	FISA5	FRA	

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BAZ
DOI

PAL
SAT
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BEA
FON
SOL
KHA
MOU



GROUP C				TEAM
	Sidy	MAM2	FRA	C1
	Ahmad	MAM2	FRA	
	Yutaro	Waseda	JPN	
	Kaoru	Waseda	JPN	
	Alexis	FISA5	FRA	
	Antoine	FISA5	FRA	
	Baye Djily	FISA5	FRA	
	Antoine-Hugo	FISA5	FRA	

Zakaria	MAM2	LBN	C2
Yuto	Waseda	JPN	
Koki	Waseda	JPN	
Yuto	Tokyo	JPN	
Alexandre	FISA5	FRA	
Adrien	FISA5	FRA	
Tanguy	FISA5	FRA	
Jérémie	FISA5	FRA	