NEWSLETTER

RELEASE DATE:
__.10.2023

CONTACT INFORMATION:
Dissemination Committee

MathICs e-NEWSLETTER #5

CONTENT:

1. News about MathICs project……
2. Follow up of WP5: Mentoring sessions preparation……..……
3. Follow up of MathICs caravan……..
4. Dissemination events……..……..……
5. Master's theses on topics related to MathICs project ……..……
6. Upcoming events and dates ……

Annex: Course themes chosen and proposed by participants

I. News from MathICs project

After the fourth newsletter, MathICs project began the MathICs Caravan, that plays a pivotal role in MathICs' dissemination strategy, serving the dual purpose of sharing MathICs' expertise in integrating ICT into mathematics education and promoting awareness of ICT's educational applications in Morocco.

Over the last few months, PMB has convened numerous virtual meetings to address the delayed installation of equipment among some partners, evaluate the impact of this delay on the project, and proactively mitigate any potential adverse effects.

The Quality committee formulated questionnaires for use at the Caravan events and subsequently analyzed the initial responses received.

The Dissemination and Exploitation Plan (DEP) was revised by the Dissemination Committee.

During this quarter, Marrakech suffered one of its biggest disasters, an earthquake on 8 September. The entire MathICs community sent its condolences to the Moroccan Partners for the lives lost and showed solidarity in the recovery from this accident.

II. Follow up of *WP5: preparation of Mentoring Sessions*

After completing the WP2-4 training, Moroccan participants engaged in the application phase of those trainings. This phase entailed selecting specific mathematics lessons and creating mathematics videos and quizzes.

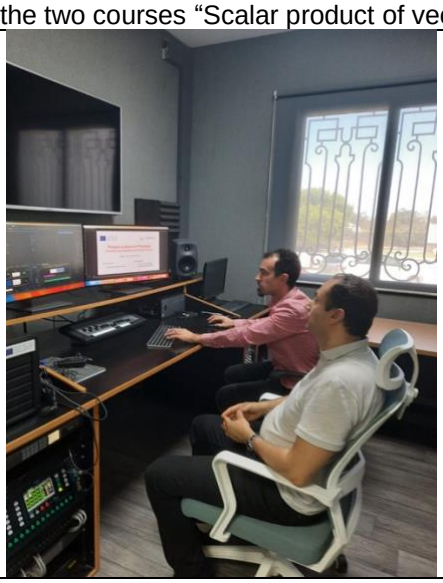
As part of the training process, the adopted procedure for this stage was as follows:

- Moroccan professors undergoing the initial phase of training suggested courses aligned with their teaching domains in their respective institutions. Diverse courses were proposed: Analysis, Algebra, Probability, Statistics, Numerical Analysis, and more. Additionally, as some participants were teachers for middle and high schools in the second stage of training, Professors Bennis and Fahid introduced courses tailored to these levels. They also included subjects on pedagogy, such as "Pedagogical Obstacles" and "Error Analysis."
- Subsequently, a message was dispatched to participants containing a list of proposed courses by Moroccan professors. Then, participants were guided to choose their topics and communicate their final selections to Professor Bennis, who oversaw the coordination of this phase. In this training phase, a total of 96 participants were involved.
- After consultations and discussions, the participants were grouped according to their chosen subjects. Some participants propose to work on courses rather than those offered by Moroccan teachers. (See Appendix: Course themes chosen and proposed by participants)
- To facilitate communications, WhatsApp groups were created by Professor Bennis. Then, the following teams were involved:
    - Team on courses of middle and high schools (supervised by Professors Fahid and Bennis).
    - Team on didactical and pedagogical subjects (supervised by Professors Fahid and Bennis).
    - Team on courses of (first university year) algebra (supervised by Professor Bennis).
    - Team on courses of linear algebra (supervised by Professor Bennis).
    - Team on courses of Diagonalization of endomorphisms and Matrices (supervised by Professor Bennis).
    - Team on courses of (first university year) analysis (supervised by Professor Abdelali and coordinated by Professor Bennis).
    - Team on courses of Descriptive statistics (supervised by Professor Kaicer).
    - Team on courses of non-parametric statistics (supervised by Professor Benghabrit and coordinated by Professor Bennis).

- Team on courses of polynomial interpolation (supervised by Professor Medarhri and coordinated by Professor Bennis).

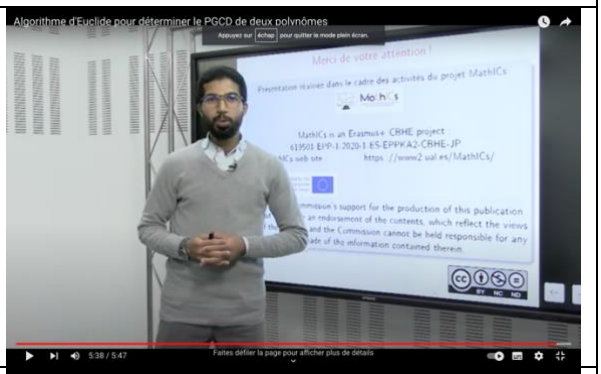
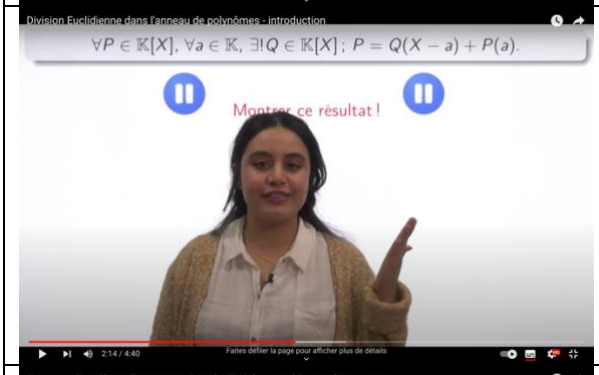
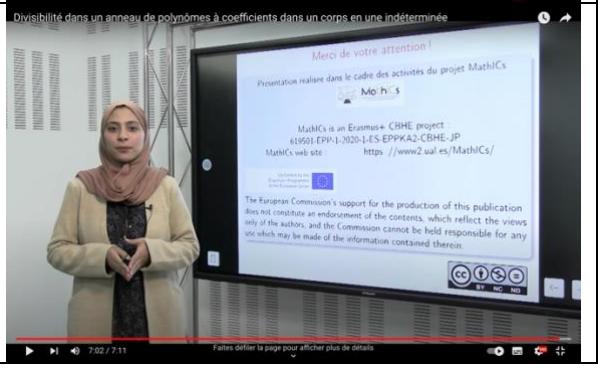
- **Some Results:**
  - To date, **53 videos** presentations have been prepared, and more than 20 videos have been recorded. Moreover, several quizzes have also been developed.
  - Professors Bennis and Fahid conceived in collaboration with a teacher of a high school, a course (Scalar product of vectors) in hybrid format. Two videos, two quizzes and pdf files were produced. A webpage was created for this course in MathICs applications website: https://sites.google.com/view/mathics-cbhe-erasmus/mathics-applications/lycee-college/produit-scalaire
    This course was given with the student of the teacher. During the implementation, the caravan of MathICs visited the school and experimented the use of "quizzes" online tools.
  - Professors Bennis and Fahid conceived in collaboration with a teacher of a middle school a course (Affine and linear functions) in hybrid format. Two videos, two quizzes and pdf files were produced. A webpage was created for this course in MathICs applications website: https://sites.google.com/view/mathics-cbhe-erasmus/mathics-applications/lycee-college/linear-functions
    This course was given with the student of the teacher. During the implementation, the caravan of MathICs visited the school and experimented the use of "GeoGebra" software in some related mathematics problems.

Photos taken in a studio at Ibn Toufail University when some videos were registered for the two courses "Scalar product of vectors" and "Affine and linear functions".



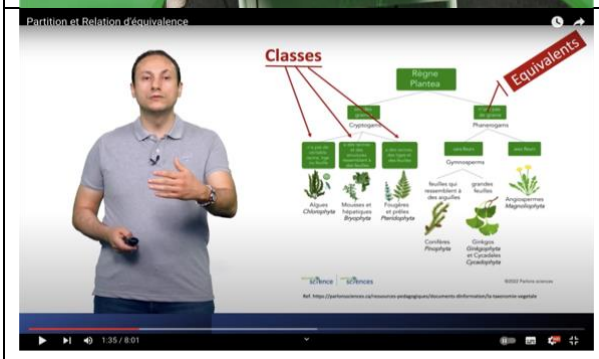
  - Professor Bennis created a webpage and YouTube channel for his Algebra (first year course in university):
    https://sites.google.com/um5r.ac.ma/driss-bennis/teaching/algebra-s1
    - He succeeded with his team to implement several videos and quizzes for the benefit of the first-year students of Faculty of Sciences for the two Chapters on polynomial ring and Fractional fractions. See, for instance: https://sites.google.com/um5r.ac.ma/driss-bennis/teaching/algebra-s1/ch3/def-poly
      https://sites.google.com/um5r.ac.ma/driss-bennis/teaching/algebra-s1/ch4/def-frac-ration
    - The videos showed MathICs and Union European logos. Some of these videos have reached an audience of 1000 views. (see https://www.youtube.com/@Maths_En_Videos).

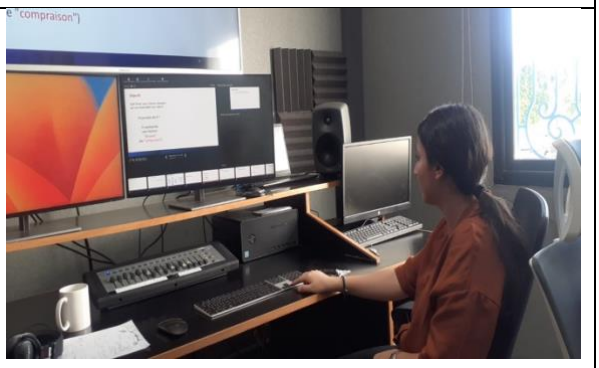
- Professor Bennis integrated the videos, last year, into his teaching approach with his students, and also in the current academic year.

Photos taken in a studio at Faculty of Sciences of Rabat when some videos were registered.
     

- Professors Bennis and Fahid conceived a part of general algebra course in hybrid form. Two videos were produced. This has been also used in MathICs caravan.

Photos taken in a studio at Ibn Toufail University when some videos were registered.





III. Follow up of MathICs Caravan

The caravan is composed of two types of events distinguished according to the event's location and its target group in the following way.

1. First types of MathICs Caravan:

- **Locations:** Middle and high schools
- **Target group:** Teachers and students.
-

For middle and high schools, two types of activities are planned, each of which will take place in the different schools that have been selected and are specified in the table included below.

1.1. First type of activities in middle and high schools:

- **Title:** Preparation of and experimentation in a hybrid class.
- **Workteam:** Luis Oyonarte Alcalá, José Carmona Tapia, Fouad Bennis, Ana Moura Santos, Driss Bennis, Brahim Fahid.
- **Activity:** the team will prepare a hybrid classroom concept in collaboration with some teachers from the schools to be visited. The prepared material will then be applied and shared in a class of students from the visited schools. The experience will take place in the presence of the MathICs team who will take the opportunity to make a brief presentation of MathICs in the presence of the teachers of the schools and also the administrators.

These experiences will be presented and shared with participants in the type II activities of the Caravan.

Follow us :

1.2. Second type of activities in middle and high schools:

- **Title:** Use of software and hardware in the teaching of mathematics.
- **Workteam:** Luis Oyonarte Alcalá, José Carmona Tapia, Ibtissam Medarhri, Khalid Najib.
- **Activity:** to share, in the form of workshops, with students and teachers of the chosen schools, some examples and activities previously elaborated by the workteam, to show the importance of the software and hardware used in the teaching of mathematics.

2. Second types of MathICs Caravan:

- **Locations:** Higher education institutions and education-related directorates (faculties of Moroccan Universities and private colleges of AMESUP, Centers for Education and Training Professions, Higher Schools of Education and Training and the Provincial Directorate of National Education).
- **Target group:** Professors, Students of higher education institutions, Pupils (future teachers), Education Inspectors, and any pedagogical actor interested in the teaching of mathematics.
- **Title:** Use of ICT in the teaching of mathematics (MathICs experience).
- **Workteam:** Luis Oyonarte Alcalá, José Carmona Tapia, Fouad Bennis, Ana Moura Santos, Driss Bennis, Brahim Fahid, Ibtissam Medarhri, Khalid Najib, Zine El Abidine Abdelali.
- **Activity:** the activities will focus on sharing the experience of the MathICs project through the organization of workshops to show good practices in the use of ICT in mathematics education.

All activities will start with a presentation of the MathICs project (objectives, activities and impact). The workshops will be the following:

Workshop 1: ICT in mathematics teaching and pedagogical approaches in the use of ICT.
Workshop 2: On the production of educational videos.
Workshop 3: On e-assessment.

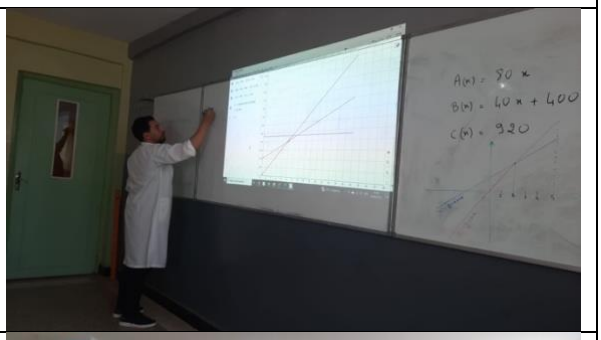
A multitude of educational institutions across various Moroccan cities are featured on the list of venues for Caravan activities. Various educational institutions in Morocco, situated across different cities, are featured on the list of locations where the Caravan's activities will occur. This ensures a broad reach, encompassing individuals who are either directly involved in education or have a keen interest in it.

The following table presents general information of the MathICs caravan stations that have already been completed. More detailed information will be provided beneath the table.

Institution	City	Number of participants
Assidiq school (Primary-Middle-High)	Kenitra	31
High school Ahmed El Bouanani	Tamesna	20
Regional Center for Education and Training Professions	Safi	79
Regional Center for Education and Training Professions	Marrakech	59
Faculty of Sciences of the University Sidi Mohamed Ben Abdellah	FES	44
Higher School of Education and Training of the University Mohammed the First	Oujda	45
Private school - HESTIM (in AMESUP)	Casablanca	25
Private school - ILCS (in AMESUP)	Rabat	24

- ***April 2023***

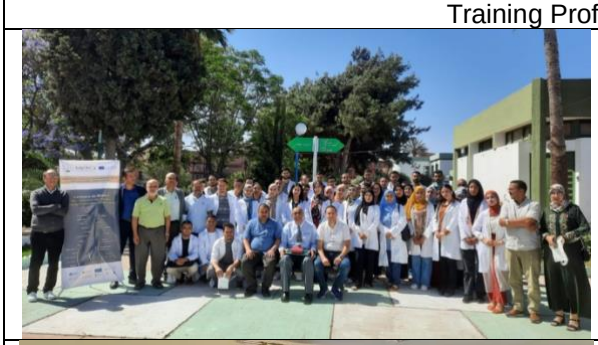
MathICs Caravan commenced in April 2023 with a series of activities designed for teachers in middle and high schools. Specifically, a team of MathICs members and some professors from middle and high schools collaborated to develop mathematics courses in a blended learning format. These courses were conducted in two educational institutions, and the outcomes of these two experiments will be presented and analyzed in various teacher training establishments with a focus on future mathematics educators.

Photos taken in the first middle and high schools visited by MathICs caravan	
	
	

- ***May 2023***

On May 9, 2023, MathICs Caravan took place at the Regional Center for Education and Training Professions in Safi. This event was a fruitful day filled with activities and workshops centered around the utilization of information and communication technology (ICT) in mathematics education. The topics covered included hybrid teaching, best practices for creating instructional video, and the design and production of online tests, among others.

On May 10, 2023, the same activities that were offered in **Marrakech** were also provided at the Regional Center for Education and Training Professions in Marrakech.

Photos taken during the activities of MathICs Caravan in the Regional Center for Education and Training Professions in Safi	
	
	

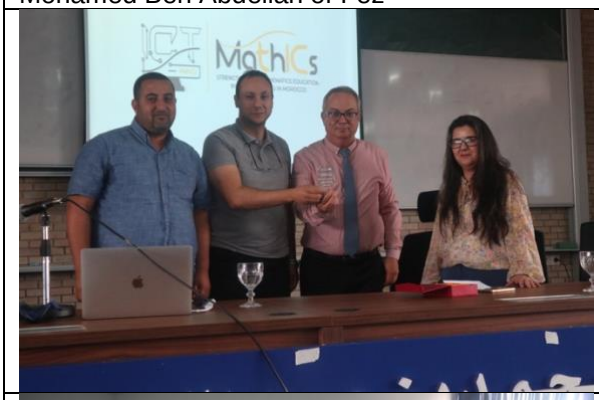
Photos taken during the activities of MathICs Caravan in the Regional Center for Education and Training Professions in Marrakech

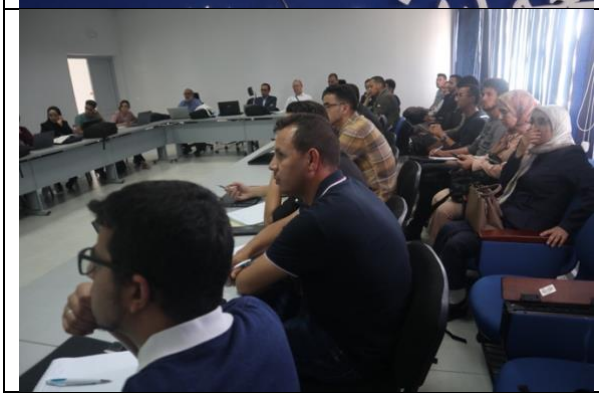



- ***June 2023***

Afterward, the Caravan relocated to Fez on June 1, 2023. This time, the program was tailored to the new participants, which included professors from the Faculty of Sciences in Fez and mathematics Ph.D. students. Specifically, the examples and workshops were centered on the integration of ICT in higher education.

Photos taken during the activities of MathICs Caravan in Faculty of Sciences of the University Sidi Mohamed Ben Abdellah of Fez




On June 12, 2023, the MathICs team travelled to eastern Morocco, specifically to the city of Oujda, where they were warmly received by the Higher School of Education and Training of Oujda. This institution, which combines higher education and training, retains a significant portion of the university program focused on mathematical specialties. This unique characteristic motivated us to engage in more profound and diversified discussions, thereby expanding the influence of the MathICs Caravan.

Photos taken during the activities of MathICs Caravan in Higher School of Education and Training of Oujda





- ***July 2023***

Incorporating private higher education institutions into the MathICs vision is also one of the objectives of the caravan. In collaboration with our associate, the Moroccan Association of Private Higher Schools (AMESUP), we successfully organized the MathICs Caravan at two private engineering schools in Casablanca (July 6, 2023) and Rabat (July 11, 2023), with participation opened to all AMESUP members. As is customary, the activities fostered a stimulating atmosphere where pertinent questions, informed comments, and enriching interactions facilitated productive discussions regarding the utilization of ICT in the private education sector.

Photos taken during the activities of MathICs Caravan in the engineering schools HESTIM in Casablanca



Photos taken during the activities of MathICs Caravan in the engineering schools ILCS in Rabat

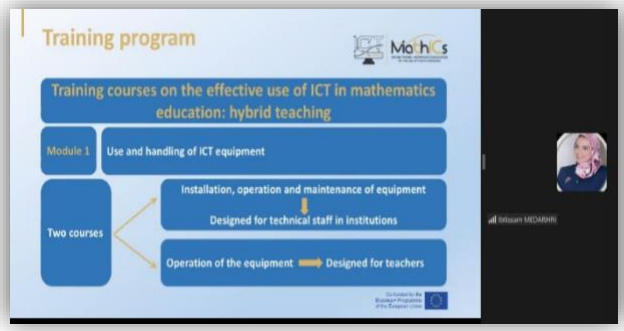



IV. Dissemination events & Master's theses

1. Dissemination events

Some MathICs members have shared mathematics achievements and activities in events where they were participating.

- **Monday June 19, 2023**, The RMEI (Mediterranean Network of Engineering Schools) held its general assembly online. This meeting provided an opportunity for Ibtissam Medahri, a member of this network, to give a short presentation of the MathICs project. Additionally, a project description was added to the official RMEI website : https://rmei.info/en/events/news



- **Monday June 05, 2023** at Regional Center for Education and Training in Dakhla. Séminaire scientifique sous le thème "Mathématiques et Interdisciplinarité".Professor Najib Khalid participated as a speaker in the scientific symposium on the theme "**Mathematics and Interdisciplinarity"**. His presentation focused on the experience of the MathICs project under the title: "Teaching Mathematics in the Digitalization Age: The Case of the MathICs Project." This event was designed to benefit mathematics teachers at all levels (primary, secondary, higher education) in the Dakhla-Oued Eddahab region, as well as the general public.

The following table presents general information of the MathICs dissemination events that have been completed during this months.

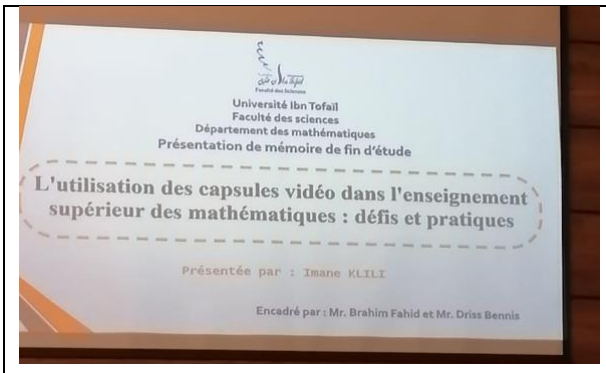
Institution	City	Number of participants
RMEI general assembly	Online	30
Regional Center for Education and Training	Dakhla	40

2. Master's theses on topics related to MathICs project

To showcase the outcomes of MathICs, Professors Brahim Fahid and Driss Bennis supervised two master's thesis. Professor Najib Khalid, also as one of MathICs, was a member of the Jury of both Master's defenses.

- The first project focused on the utilization of video content in higher mathematics education. The analysis encompassed videos, including those generated within the formal framework of the MathICs project by Professor Driss Bennis and presented by

students, as well as videos sourced from YouTube. The emphasis was on identifying and highlighting key elements.



- The second project delved into the practices and challenges associated with formative e-assessment in higher education mathematics. The analysis centered on quizzes related to first-year algebra, which were created within the MathICs project by Professor Driss Bennis and some participants in MathICs training. The overarching goal of these theses was to contribute to the advancement of audiovisual technologies and quiz-based assessments in higher mathematics education in Morocco.

V. *Upcoming events and dates*

- ❖ Next Project meetings

  7-9th November 2023: PMB meeting in Marrakech, Morocco

- ❖ Next Dissemination Events:

  Marrakech (6 November 2023)

  Three final MathICs dissemination events will be held within our Moroccan partner institutions in Kenitra, Rabat and Beni Mellal. The events aim to present and share the achievements of MathICs. The date of each event will be determined at the next PMB meeting to be held in Marrakesh.

❖ Next MathICs Caravan Events:

The MathICs caravan program for this academic year has been rescheduled due to various reasons. The updated proposal is outlined as follows:

Months	Institutions	Cities
November 2023	High School Moulay Ismail	Meknès
December 2023	High School Timahdite	Ifrane
December 2023	High School Ouad Eddahab	Tifelt
January 2024	High school Ibn khayyam	Kenitra
February 2024	Middle school deuxième chance	Casablanca
Mars 2024	Regional Center for Education and Training Professions	Khemissat
April 2024	Regional Center for Education and Training Professions	Settat
May 2024	Académie Internationale Mohammed VI de l'aviation civile - AIAC Mohamed VI -	Casablanca
June 2024	Higher School of Education and Training of the University Chouaîb Doukkali	El Jadida
July 2024	Polydisciplinary Faculty of the University Abdelmalek Essaadi	Laarache

Appendix: Course themes chosen and proposed by participants

Dérivé d'un polynôme et premières applications; DES en utilisant Identité de Bézout; Degré d'un polynôme et applications; DES - Parité et conjugué; Introduction à l'anneau de polynôme; Division euclidienne dans l'anneau de polynômes; Formule de Taylor et multiplicité d'un racine d'un polynôme; PGCD de deux polynômes; Polynômes irréductibles; des cas particuliers des fractions rationnelles; Définition d'un Groupes et exemples; Divisibilité dans l'anneau de polynômes; Introduction aux anneaux; Introduction à la multiplicité d'une racine d'un polynôme; SageMath pour le calcul de la décomposition des fraction rationnelles en éléments simples; Analyse de la première année (huit parties); Interpolation polynomiale (introduction); Interpolation polynomiale (Polynômes de Lagrange); Interpolation polynomiale (Polynômes de Newton); Estimation de l'erreur d'interpolation; Introduction à l'Addition des Nombres relatifs (1AC); Introduction aux Nombres relatifs (1AC) et fonction linéaires (3AC); La droite qui passe par les milieux de deux côtés d'un triangle (2AC); Introduction aux vecteurs (2AC); Translation (2AC); Somme de deux vecteurs (2AC); Introduction aux fonctions (3AC); Racines carrées**s** - Introduction (2AC); Théorème de Pythagore (introduction et exemples); Équation réduite d'une droite (3AC); Introduction à la statistique descriptive (Terminologies); Tableaux statistiques (des effectifs et/ou les fréquences (cumulées)); Paramètres de dispersion (statistique descriptive); Quelques utilisation du logiciel R en Statistique descriptive; Équations différentielles du premier ordre. Partie 1 (Bac SM); Équations différentielles du premier ordre. Partie 2 (Bac SM); Équations différentielles du second ordre (Bac SM); Produit scalaire de deux vecteurs : introduction et définition; Produit scalaire de deux vecteurs : introduction et définition; Produit scalaire (Propriétés); Applications du produit scalaire (Théorème de la médiane); Applications du produit scalaire (Théorème d'Al-Kashi); Etude de fonctions - convexité (1BAC); Etude de fonctions - tangente (1BAC); Étude de fonctions - Branches infinies (1BAC); Etude d'une fonction - Récapitulatif et exemple 1; Étude d'une fonction - Asymptote; Test non-paramétrique; Test non-paramétrique; Obstacles didactiques Mathématiques (partie 1); Analyse des erreurs Mathématiques; Obstacles didactiques Mathématiques (partie 2); Obstacles didactiques Mathématiques (partie 3); Évaluation; Introduction aux séries de fonctions et convergence

simple; Convergence normale des séries de fonctions; Convergence uniforme des séries de fonctions; Introduction aux séries numériques; Critère de D'Alembert et application; Introduction aux espaces de Sobolev; Introduction à la topologie; Théorème de convergence dominée; Introduction aux mesures; parallélogramme (4 parties); Introduction aux dynamique de populations; Introduction à la modélisation multi-agent; Introduction aux probabilité; Utilisation du logiciel pour la résolution d'un problème mathématique; Algorithme d'Euclide ou d'autres algorithmes (implémentation avec SageMath); Introduction à l'Analyse de données avec R; Introduction à l'économétrie; Introduction aux probabilité Introduction aux chaines de Markov; Inéquations de degré un (tronc commun lycée); Sur les mathématiques appliquées à la physique; Applications linéaires (4 Parties); Matrices et applications linéaires (définition et exemples); Matrices et applications linéaires (changement de base et matrices de passage); Valeurs et vecteurs propres (partie 1/4, Valeurs et vecteurs propres); Valeurs et vecteurs propres (partie 2/4, Vecteur propre et polynôme caractéristique); Diagonalisation des matrices (partie 3/4: Sous-espace propres); Diagonalisation des matrices (partie 4/4 : Multiplicité d'une valeur propre et application); Mathematical modeling: AIDs/HIV