Regulations of the ETEAM: European Tournament of Enthusiastic Apprentice Mathematicians

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1 Preamble

The European Tournament of Enthusiastic Apprentice Mathematicians (ETEAM) is aimed at providing outstanding high school students with a first encounter with mathematical research, together with the teamwork process and international experience.

It combines competition with friendly exchanges to encourage emulation and conviviality. The participants work on open problems which, to the best of the authors' knowledge, do not yet admit complete solutions.

The expected participants are high school students with an excellent mathematical level, who are not yet enrolled in university studies. They take part in the ETEAM in teams of four to six members, led by one or two additional team supervisors. The following regulations are established to allow for the smooth running of the ETEAM, and in particular for fair conditions for competition between the teams. These regulations may be modified by the MOC if needed. However, they should remain unchanged during the period between the deadline at which the teams should have registered and the end of the on-site Tournament. If applicable, the teams which have already registered should be clearly notified of the most important modifications.

The ETEAM is the European version of three similar Tournaments:

- ITYM, which is the international version;

- TFJM², which is the French national version;

- MTYM, which is the Moroccan national version.

These regulations are heavily influenced by those of the aforementioned Tournaments.

The ETEAM is open to participation from all European countries. In order to ensure fair competition and scientific excellence, it is expected that the ETEAM be first contacted by working mathematicians from a given country who are willing to register and prepare a team for the Tournament, and willing to suggest and organise a competitive selection process in their home country.

Should a team have questions about these regulations, they may write to the organisers at the following email addresses: `benoit.loisel@animath.fr` and `antoine.detaille@univ-lyon1.fr`. Interested people may also visit the ETEAM website: `eteam.tfjm.org`.

Contents

2 Organisational structure of the Tournament

2.1 General aspects

The ETEAM is co-organised by the Multinational Organisation Committee (MOC), Scientific Organisation Committee (SOC), and Local Organisation Committee (LOC). For each edition of the ETEAM (one per year), a list of problems (between 9 and 11) is published on the ETEAM website at least 12 weeks before the beginning of the Tournament. The exact date of release of the problems will be communicated each year on the website.

The Tournament consists of debates on the solutions provided by the participating teams. These debates are organised in 3 different rounds, each having several stages. In each round, the teams are divided into several groups of 3, 4, or 5 different teams. The composition of the groups is determined by the MOC. The different groups simultaneously proceed to the debates of a given round. Two different rounds cannot take place on the same day.

2.2 The Multinational Organisation Committee (MOC)

The organisation of the ETEAM is managed by the Multinational Organisation Committee (abbreviated MOC).

The MOC is made up of members of at least 3 distinct nationalities. The MOC members may be professional mathematicians (researchers, teachers, etc.), former team leaders, graduate students in mathematics, or people involved in a former version of a Tournament similar to the ETEAM (including but not limited to ITYM, TFJM², and MTYM). Anyone who satisfies the aforementioned conditions can apply to become a MOC member. The approval of such an application is at the discretion of the existing MOC members.

The MOC:

- takes care of all non-local organisational tasks (website, timetable, rules, etc.);

- manages the ETEAM communication (addition of new teams, media, etc.);

- organises the participation procedure (team registration, etc.);

- publishes the final results of the competition;

- organises the opening and the closing ceremonies;

- coordinates the other committees;

- selects the LOC and SOC, and approves changes in their members.

The MOC is the ultimate authority for conflict resolution, as specified in Section 5.4 (Final provisions). The list of MOC members is published at least four months before the beginning of the Tournament.

2.3 The Local Organisation Committee (LOC)

The Tournament has a Local Organisation Committee (abbreviated LOC). Its members are appointed by the MOC and change every year, depending on where the Tournament takes place. The LOC can be a group of individuals or an already formed association. They need not have any connection to mathematics, but are expected to have organisational skills.

The mission of the Local Organisation Committee is to organise the venue and amenities of the Tournament, and in particular:

- to provide space for the debates, the deliberations of the Jury, and the opening and closing ceremonies;

- to find and book accommodation for participating students, team leaders, organisers, and jurors;

- to organise additional social activities for participating students, team leaders, organisers, and jurors;

- to organise meals for participating students, team leaders, organisers, and jurors;

- to provide local jurors.

2.4 The Scientific Organisation Committee (SOC)

The Tournament has a Scientific Organisation Committee (abbreviated SOC).

The list of members of the Scientific Organisation Committee is selected by the MOC and any changes thereof are approved by the MOC. It is made up of researchers or students with sufficiently good mathematical skills. The list of SOC members is published at least four months before the beginning of the Tournament.

The SOC's mission is:

- to organise the scientific aspects of holding of the Tournament (scoring, ranking, etc.);

- to appoint the juries, and their chairs and co-chairs;

- to arbitrate possible scientific disagreements;

- to create the list of problems for the ETEAM;

- to check that no substantial answers to the problems can be found easily on the Internet or given by a generative AI.

2.5 The Jury: local and international jurors

Participating teams will compare their results during mathematical debates in each round, and be graded by a Jury. This Jury is composed of researchers, teachers, former participating students, graduate students, and, if necessary, of team leaders.

Each Jury of a group has 5 to 8 members of at least 3 distinct nationalities. A team leader cannot be a juror in a group in which their team is participating. Each Jury is

led by a chair, who is assisted by a co-chair. For each round, the Jury of each group is appointed by the SOC. The chair is responsible for the smooth running of the group as well as for the resolution of unforeseen issues which require rapid decision-making.

The jurors are selected either by the LOC or by the SOC. A juror recruited by the LOC is called a "local juror" while a juror recruited by the SOC is called an "international juror".

3 Conditions of participation

Participating students must register as a team satisfying composition rules which are described below. Before enrolling, a team must liaise with the MOC.

At most two teams from each European country, and at most one team from each extra-European country, are allowed to participate. Here, European countries are understood as countries from the European Union, countries from the Schengen Area, countries from the Balkans, and the United Kingdom.

Once a team's participation is accepted by the MOC, the team must pay participation fees. The registration process, as well as more details concerning participation fees, are described in Appendix B.

3.1 Composition of a team

A team consists of:

- four to six (4-6) participating students;

- one to two (1-2) team leaders.

It is strictly forbidden for the same person to be part of more than one team, even for the team leaders. An organiser (member of the MOC, the SOC, or the LOC) cannot be a member of a team, either as a participating student or as a team leader.

3.1.1 Participating students

The Tournament is intended for general upper secondary education students (15 to 19 y.o. students). The participating students cannot have started university studies or equivalent at the time of their application for participation in the ETEAM.

Participating students work within their team to look for solutions to the proposed problems. They write up written materials for the ETEAM, present their work, and participate in debates at the Tournament.

Any participating student registered in more than one team will be disqualified from the ETEAM of the current year.

3.1.2 Captain

Each team has to nominate a captain among the participating students (a team leader cannot be a captain).

3.1.3   Team leaders

Team leaders are people who are qualified in mathematics (such as teachers, researchers, PhD students, or graduate students). Team leaders must have obtained a graduate degree (or equivalent) in mathematics, computer science, or physics. If a person who does not have one of these qualifications wants to be a team leader, they may address a request to the MOC. If needed, the MOC may require an additional team leader.

Throughout the Tournament, the team leaders ensure that the work of their team runs smoothly. Before the beginning of the encounter, their role is to:

- ensure that the team works regularly with a good collaboration within the group;

- manage coordination;

- answer students' questions;

- provide the students with specific mathematical knowledge (including bibliographical references) when they request it (and only when they request it);

- correct any major mistakes and prevent the team from falling into a dead end;

- supervise the editing of the written material and give advice on how to write a scientific paper.

It is strictly forbidden to provide elements of the solution to any problem question, or any direct indication. Likewise, the written material is the responsibility of the participating students. The work of team leaders must be limited to proofreading and advice.

During the Tournament, team leaders are responsible for the members of their team. Their role is also that of a team coach and manager. They can also be part of the Jury of a group in which their team is not running. Exceptionally, if no team leader can be present during the Tournament, another adult may replace them in this role, with prior authorisation from the MOC. The absence of all the team leaders of a team may result in the disqualification of the team.

3.1.4   Name of the team

Each team has to choose a name and a fourgram (four letters), that will be used to identify the team. Two different teams cannot choose the same name or the same fourgram. The name and fourgram cannot carry inappropriate messages or connotations (subject to the decision of MOC).

Any team that does not respect the aforementioned structure, or the role of participating students and team leaders, is subject to sanctions which may reach disqualification, depending on the seriousness of the breaches.

3.2   Spectators

With authorisation from the LOC and the MOC, spectators may attend the Tournament. Spectators who have ties to participating students are not allowed. For example, non-participating students coming from the same establishment as one of the teams

cannot be allowed. The interpretation of this criterion is left to the discretion of the MOC.

4   Process of the Tournament (scientific aspects)

The working language of the ETEAM is English and should be used during all official Tournament events.

4.1   Problems

A list of 9 to 11 problems is established by the SOC and published on the website of the ETEAM at least 12 weeks before the beginning of the Tournament. The ETEAM problems are expected to be difficult and to contain parts with no currently known solution by the authors.

4.2   Research and writing of solutions

The participating students are supposed to work on the problems with the other members of their team and under the supervision of their team leaders, with possible additional input from their teachers.

Each team conducts its research independently of the other teams. While it is permitted to discuss problems with people not participating in the Tournament, it is forbidden to ask them for direct help, i.e. explicit solutions or hints towards parts or the whole of the problems. This prohibition extends to asking for help on groups, websites, and forums on the Internet.

A team's written material must be the result of the reasoning of the members of the team, and only of them. For example, if a group of students not yet forming a team are potentially interested in participating, they should contrive to work only with the people who will be part of their team if they eventually participate.

Plagiarism is strictly forbidden. It is also expected that the students write their materials by themselves, without substantial help of generative AI.

Any violation of the above rules will lead to a sanction, decided by the SOC, which may go up to disqualification.

4.3   Written material

For each problem handled by a team, the team prepares a written report on their work, which will hereafter be called *written material*. Each of these written materials must be sent to the MOC in a PDF file following a process detailed in the Appendix. There is a limit of 30 pages (for a document written A4, 11pt, 2cm margin size, and default LaTeX interline space, to be adapted if the format chosen by the team is different). The document must not exceed 5MB. The deadline for sending the written materials must be at least one week before the beginning of the encounter. The precise date and time are stated on the website. If these limits (size, deadlines) are not satisfied, the written material will be rejected by the MOC and the solution may be either truncated by the MOC or considered as empty.

External links (such as internet links) are permitted in the written material if, and only if, they are bibliographical resources. Any extension of the work submitted online will not be considered valid and will not be evaluated by the Jury.

The first page of each file has to contain the name of the team, the fourgram of the team, the number of the problem, and the name of the problem. The written material is the product of the team's work. Any reference to other works must be duly cited (title, author, date, page, link). If the reference is not in English or is not easily accessible (in particular if one has to pay to access it or if access is restricted), the team must provide a sufficient summary.

The written materials must be sent as separate PDF files, one for each investigated problem.

Apart from the title page, a written material should also adhere to the following dispositions:

- the pages of the written material must be numbered;

- the written material must contain a summary;

- if external references are used in the solution, there must be a bibliography.

These, and only these written materials, will be discussed during the Tournament. No text editing will be permitted after the submission deadline.

4.4 Draws

Three group draws are organised by the MOC: one a few days before the beginning of the encounter, and the two other ones shortly after the announcement of the results of the first and second rounds, respectively. They determine:

- the order of the stages of the teams within the group (and their role);

- the problem that will be defended by each team.

Section A explains the draw procedure for the current year. The general rules are:

- a given problem cannot be presented more than once in a given group of a given round;

- a given team cannot defend the same problem in two different rounds;

- each team can refuse a certain number of problems (described in section A);

- the draws do not favour any team in their design and are conducted in good faith;

- the first draw is organised online, while the second and final draws are in person.

The captain of each team must be present (online or in person) or has to nominate another captain in their team. Other members can attend (including team leaders) and quiet communication is allowed; however, the captain must give their final decision at most 20 seconds after they have drawn a problem. Otherwise, the problem is automatically considered as declined. If a team prevents the draws from running smoothly,

the chair of the draws may decide to require the whole team, with the exception of the captain, to leave the room.

For the final round, the team allocation in groups is determined by the ranking in the previous rounds (see Distribution in groups).

During the draws, a team is allowed to decline a maximum of $P-6$ problems without penalty, where P (ranging from 9 to 11) is the number of problems provided by the SOC for the current year of the ETEAM. Any additional refusal reduces the default coefficient of the Reporter's oral scoring by 25% of its initial value. For example, if $P = 10$, the default coefficient is $c = 3$. If the team refuses $P - 3 = 7$ problems for a stage, the effective coefficient for the oral scoring of the Reporter at this stage will be $c' = 0.75$ instead of 3.

4.5   Groups

In each round, the participating teams are divided into groups of 3, 4, or 5 teams (see also the section on the draws in the appendix).

4.5.1   Number of groups

The case of a group with 5 teams arises if, and only if, the amount N of non-disqualified participating teams equals 5.

In any other case, the number g of groups in a round is $g = \lceil N/4 \rceil$ (the ceiling of the quarter of the number of teams participating in the round). In this case, the number of groups with 3 teams is $4g - N$, and the number of groups with 4 teams is $N - 3g$. This corresponds to constituting as many groups of 4 teams as possible, and completing with groups of 3 teams.

4.5.2   Distribution in groups

For the first round, teams are randomly assigned to the different groups.

For the second round, teams are assigned to groups thanks to a permutation of their distribution in the first round that maximises the number of encounters between different teams.

For the final round, teams are assigned to groups based on their total scoring from the first two rounds, with the other teams whose scores are as close as possible.

4.5.3   Running order of roles

The participating teams will play the different roles described in Section 4.6 during the debates in the running order indicated by the following tables:

- Group with 3 teams

	Stage 1	Stage 2	Stage 3
Team 1	Reporter	Reviewer	Opponent
Team 2	Opponent	Reporter	Reviewer
Team 3	Reviewer	Opponent	Reporter

10

- Group with 4 teams

	Stage 1	Stage 2	Stage 3	Stage 4
Team 1	Reporter	Observer	Reviewer	Opponent
Team 2	Opponent	Reporter	Observer	Reviewer
Team 3	Reviewer	Opponent	Reporter	Observer
Team 4	Observer	Reviewer	Opponent	Reporter

- Group with 5 teams

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Team 1	Reporter	-	Observer	Reviewer	Opponent
Team 2	Opponent	Reporter	-	Observer	Reviewer
Team 3	Reviewer	Opponent	Reporter	-	Observer
Team 4	Observer	Reviewer	Opponent	Reporter	-
Team 5	-	Observer	Reviewer	Opponent	Reporter

If it makes it easier for the organisers (including time schedule, number of juries, etc.), a group of 5 teams can also be split into 2 simultaneous subgroups (Rooms) according to the following table:

	St. 1 Room 1	St. 1 Room 2	St. 2 Room 1	St. 2 Room 2	St. 3 Room 1
Team 1	Reporter	Observer	Reviewer	Opponent	-
Team 2	-	Reporter	Observer	Reviewer	Opponent
Team 3	Opponent	-	Reporter	Observer	Reviewer
Team 4	Reviewer	Opponent	-	Reporter	Observer
Team 5	Observer	Reviewer	Opponent	-	Reporter

In this case, the same problem can be reported twice in the group, during the same stage (and, therefore, in different rooms).

In the event that the two rooms are not synchronised, the teams will be able to participate in the debates alternately in rooms 1 and 2.

The team that is not playing a role at a stage in a group with 5 teams can have a break.

4.6 Stages: roles and timeline

Any person disturbing the stages can be excluded immediately from the room by the chair of the Jury, whether they are a team leader, a participating student, or a spectator.

Only one team member from each team may take the floor during each stage. Other members of the team are allowed to make brief remarks if, and only if, the chair of the Jury gives them permission. The participating students are prohibited from communicating by any means with the speaker once they have started speaking. They are however allowed to communicate discreetly with each other, including with the speaker before they take the stage.

Within each round, the roles of Reporter, Opponent, and Reviewer must be performed by different members of the team. For instance, the same person cannot be

Reporter and Opponent in the same round, but they can be Reporter and Observer. In the event of very exceptional circumstances (such as illness of other members of the team), the chair of the Jury may allow a participant to play two different roles in a given round.

The whole team attends the group which they are part of, except if the round has 5 teams, in which case the team must be split into the two rooms. During the stages, the team leaders are allowed to spectate (unless they are part of another Jury) but cannot, under any circumstances, communicate with their teams. They watch the debates from a place in the room away from their team.

4.6.1 Timeline of a stage

J.	$\simeq 2$ min	Presentation of the Jury (1st stage only)
Rep	< 10 min	Oral presentation of the Reporter
Rep – Opp	$\simeq 8$ min	Questions of the Opponent to the Reporter
Opp	< 1 min	Concluding speech of the Opponent
Rep	< 2 min	(non-mandatory) Reply of the Reporter
Rep – Opp – Rev	$\simeq 7$ min	Questions of the Reviewer to the Reporter and Opponent
Rev	< 1 min	Concluding speech of the Reviewer
Non-mandatory actions		
Obs	< 2 min	Questions and remarks of the Observer
Rep	< 2 min	Additional remarks of the Reporter
Opp	< 2 min	Additional remarks of the Opponent
Rev	< 2 min	Additional remarks of the Reviewer
J. – Rep – Opp – Rev – Obs	$\simeq 15$ min	Questions/remarks of the Jury
J.	$\simeq 20$ min	Discussion of the Jury about the oral

The time limit for the presentation of the Reporter is strict (at most 10 minutes). The other time limits are enforced by the chair of the Jury, with more flexibility if appropriate. The chair or the co-chair of the Jury can provide an indicative sign to the leader of the debate when the time limit is close to the end (for example, holding up a "1 min" sign).

4.6.2 The Reporter

The Reporter presents the main ideas and results obtained by their team while solving the problem. A laptop and a projector will be available so that the Reporter may use slides. A black or white board will also be available. One of the main goals of the Reporter is to make their performance understandable by the audience, including those who have not read the written material.

The presentation should be based on the written materials (see Section 4.3). We emphasise the fact that the Reporter is only allowed to present:

- parts of the written materials with no modification, e.g., exact statements, figures, and diagrams;

- ideas, and sketches of solutions and proofs, which are used in the written materials.

Minor adjustments with respect to the written material can be made provided that they are explicitly indicated. It is possible to add examples and illustrations. The Jury may penalise any breach of this rule. It is left to the discretion of the Jury to determine whether a modification is a mathematical novelty (and therefore forbidden) or a modification which is made only for the sake of exposition (and therefore allowed).

After their presentation, the Reporter answers the questions asked to them by the Opponent, the Reviewer, and the Jury to the best of their ability.

4.6.3 The Opponent

The Opponent analyses the Reporter's oral presentation with the aim of detecting its potential errors and inaccuracies, as well as its strengths, assessing their importance. The Opponent has time to ask the Reporter questions, allowing the Reporter to fix any shortcoming or mistake in their presentation. Among the questions, they may ask the Reporter to explain some elements of their solution.

However, the Opponent should not turn the discussion towards a presentation of their own solution. Excessive opposition, as well as any form of aggressiveness, will be severely penalised in the scoring given by the Jury.

The Opponent then has time to provide an analysis of the content of the Reporter's oral presentation, and of the debate which took place between the two participants. The Opponent specifies, in particular, the positive elements provided by the Reporter and indicates, if needed, the points on which they were not convinced. In particular, their evaluation may assess what is:

- correct and proven;

- correct with minor inaccuracies;

- correct but not proven (a proof is missing or there are crucial mistakes);

- doubtful;

- wrong.

4.6.4 The Reviewer

The Reviewer evaluates the debate between the Reporter and the Opponent, indicating the positive and negative aspects of the exchange. One of the main intentions of the Reviewer is to detect whether the Opponent said anything wrong or overlooked some of the Reporter's faults.

The Reviewer has time to ask questions to both the Reporter and the Opponent. These questions aim at returning to the points raised during the discussion between the Opponent and the Reporter, in case of disagreement, or to explore them in greater depth. If there are more significant mistakes (in themselves or by their consequences) than those raised by the Opponent, the Reviewer's questions must address them.

The Reviewer then has a short time to provide an analysis of the Reporter-Opponent-Reviewer exchanges. They specify, in particular, the positive elements brought by the discussion and indicate, if necessary, the points of disagreement which persist.

4.6.5 The Observer

The Observer, if applicable, only makes important and useful remarks on crucial points missed by the other participants. If no crucial point has been omitted by the other participants, the Observer should not participate in the discussion. If the Observer speaks unnecessarily, the Jury may score their performance negatively.

On the other hand, the Observer cannot be penalised even if they do not speak while a crucial mistake was missed by the other participants.

Whether they choose to speak or not, the Observer does not take the floor.

4.6.6 The Jury

The debates take place in front of a Jury which evaluates both the written materials and the oral performances (independently), taking into account both the scientific understanding of the elements and the way in which they are presented.

At the end of each stage, the Jury asks questions to any participating student who spoke during the stage. These questions help the Jury to clarify how deeply each participating student understood the material presented or discussed.

4.6.7 The spectators

Even if the LOC or the MOC allows a spectator to watch the stages, the spectators are not allowed to communicate with anyone, or to disturb the stage in any way.

4.7 Written reviews

Before each round, the teams of the Opponent, of the Reviewer, and of the Observer prepare written reviews about the Reporter's written material (see Section 4.3) that will be defended during their round. The written reviews are independent of the role played by the team during the oral.

These written reviews indicate the team's overall appreciation of the solution, their critical evaluation highlighting both positive and negative aspects of the work, and the errors and inaccuracies that they may have found in the Reporter's solution.

The format to be respected is communicated to the teams by the MOC, as well as the date and deadline for submission. The files (one for each stage) will be rendered either handwritten or in PDF format, and must not exceed 2 pages (with a standard formatting) and 5 MB. If these limits are exceeded, the MOC may either truncate the file or consider it as empty.

The written reviews are graded by the Jury (see Appendix E). If a team fails to send a written review before the deadline, there will be penalties as described in Appendix E.

5 Application of the regulations and disputes

5.1 Assignment of responsibilities

All the committees defined in Section 2 (Organisational structure) are responsible for the application of these regulations. In terms of sanctions, their powers are defined below.

The MOC may give sanctions in the event of manifest non-compliance with the rules defined in Section 3.1 (Composition of a team). These sanctions cannot in any way interfere with the function of the Jury. They can go as far as disqualification. They can also give sanctions in the event of inappropriate behaviour or disciplinary problems during the Tournament but outside the rounds.

The chair of the Jury (but no other member of the Jury) may give sanctions within their group in the event of manifest non-compliance with the rules of Sections 4.2, 4.3, 4.4 and 4.7 (Research and writing of solutions, written material, Draws, written reviews) with the aim of putting an end to the violation of the regulations. These sanctions cannot exceed the scope of their function, namely one round. In particular, they cannot proceed with a disqualification. The chair of the Jury may exclude from the room any person who disturbs the smooth running of the round.

5.2   Disqualification

In principle, only the MOC is able to pronounce the disqualification of a team, or of a team member. It can be advised in its decision either by the LOC, the SOC, or the chair of a Jury. Any disqualified team or person cannot claim their participation in the Tournament without explicitly mentioning their disqualification. In particular, they will not be recognised as a team, a participating student, or team leader in the event of a request for verification by a third person. Furthermore, a disqualified team does not appear in the ranking of the edition. The participation fees will not be refunded to the disqualified participant or to the members of the disqualified team.

5.3   Appeal

Each sanction decision may be subject to an appeal described below:

- a decision taken by the MOC may be appealed to the same MOC which will have to re-examine the question;

- a decision taken by a LOC may be appealed to the MOC;

- a decision taken by a SOC may be appealed to the MOC;

- a decision taken by the chair of a Jury may be appealed, after the end of the round and before the end of the Tournament, to the SOC.

Any appeal is sent by writing by electronic means to the usual email address of the MOC. An appeal contains an explanation of the facts and the arguments of the plaintiff. The MOC judges the advisability of hearing from different people to determine its decision.

5.4   Final provisions

Unless otherwise stated in these regulations, the MOC is the appropriate body for the management of any situation not covered in these regulations, where applicable upon consultation with other competent committees.

A Procedure for the draws

An online draw takes place a few days before the first round of the Tournament. It determines:

- the composition of the groups for the first and second rounds;

- the solution to the problem that will be presented by each team;

- the running of the teams.

In-person draws take place just after the announcement of the scores of the first round and of the second round respectively. They determine:

- the solution to the problem that will be presented by each team;

- the running order of the teams;

Before the draws, the chair of the meeting recalls the rules of the draws.

The team captain, or a member of the team who will replace them, must have a sufficient internet connection and connect to the platform at the time indicated by the Local Organising Committee. The chosen time is communicated on the website and directly to the registered teams at least 3 weeks before the beginning of the event. The draws take place shortly before the Tournament, usually the week before. The draws last for around one hour. The Local Organising Committee also asks to connect to a videoconference link to host the draw session. The other members of the team are invited to attend the draw as spectators, but this is not mandatory. Except for the team captain, the other members do not interact during the draw and their microphones must be muted. Any person disturbing the smooth running of the draws can be excluded from the meeting, by decision of the chair of the meeting.

A.1 Composition of the groups and ordering for the stages

Firstly, the team captains take turns rolling a (possibly virtual) dice. In the event of a tie, the dice can be rolled again to decide the results. These dice rolls define the distribution of the teams in the groups for the first and the second round (the chair decides of the algorithm and details it before the draws take place). The aim is to mix as much as possible the teams in different groups in the two first rounds. The scores of these dice rolls are also used to decide the order in which the teams will be called to choose the problems. The procedure for choosing the problems is described in the following paragraph.

A.2 Choice of problems

The choice of problems is made by successive choices of the team captains and is treated group by group. The random draw of the problems that will be presented in a group takes place as follows. Following the running order of the Reporters of a group, the team captain makes the following choices and actions:

1. The team captain draws a problem number at random by rolling a (possibly virtual) dice.

(a) If it is a group from second or final round and the problem number corresponds to the problem that their team defended in a previous round, the team captain immediately draws a new problem.

(b) If another team captain in the same group has already accepted this problem, the team captain immediately draws a new problem, except in the case of a 5-team group (see below).

(c) If they have drawn a problem that they have already declined during this round, they can now choose to accept it, or to immediately draw a new problem.

2. They can decide to accept or decline this problem.

   (a) If they chooses to accept the problem, the draw stops for them.

   (b) If they chooses to decline the problem, the draw moves to the next team.

3. The draw ends when all team captains have accepted a problem.

In case a situation would arise where one or several teams have reached the maximum possible level of penalty for declining problems and still continue to decline problems, the chair of the meeting may take a decision to force the draws to an end, e.g. by asking to those teams, in the running order of the Reporters of the group, to choose one of the problems that are still available, and attributing to them one at random if they do not comply.

For each round and each group, a random draw of the problems is done. These random draws are independent: it is possible that a problem is presented in the same round in two different groups/rooms.

A.3   Penalty for excessive declines

For each round, the team captain may decline at most $P-6$ problems without penalty, where P denotes the total number of problems; beyond that, each decline will decrease the multiplier coefficient l_{Rep} by 25% of its initial value (see Scoring of the ETEAM). The same problem declined several times in the same draw only counts once in the calculation of this penalty.

A.4   Exception: 5-teams group

In the case of a 5-team group, two teams will be allowed to report the same problem in the same group. In this case, the two teams concerned will defend their solution at the same Stage in different rooms. The first two teams that choose the same problem will then correspond to team 1 and team 2 of the group table (see Running order of roles), in an order that will be drawn at random. The next two, if any, will correspond to team 3 and team 4, in an order also drawn at random.

B   Procedure for team registration

Teams have to register online at https://register.eteam.tfjm.org/ following the online instructions.

Each year, the MOC, in coordination with the LOC, determines a baseline participation fee, to be paid by the participants, to compensate for the part of the cost of the organisation (hotel rooms, meals, transport for the members of the Jury, etc.) which is not covered by the sponsors. The baseline participation fee is determined to be as small as possible. Moreover, the baseline participation fee for each participant of a team is decreased if the team satisfies one or several of the following criteria (without order of importance):

- Ecological considerations (e.g. travelling by train to come to the ETEAM);

- First participation of a team from the country to the ETEAM;

- Gender parity;

- Having a national selection process;

- Social diversity;

- Team leaders bring sponsors to the ETEAM;

- Other special context.

These criteria are cumulative. For each criterion, the MOC determines a maximal amount by which the participating fee can be decreased thanks to this criterion.

Each team willing to benefit from reduced participation fees must send, via email, a cover letter to the MOC to explain which criteria are applicable to the team. The final decision of the MOC regarding participation fees will be sent back to the team within 2 weeks after reception of the cover letter.

The deadline to pay the participation fees is determined by the MOC and must be after the deadline for registration.

Should the on-site event be cancelled, participants who have already paid their participation fees will be reimbursed. However, they cannot be reimbursed for the fees (e.g. transport) that they might have paid themselves.

C Procedure to send the written material

Teams have to deposit their written material online at https://register.eteam.tfjm.org/ following the online instructions.

D Scoring of the ETEAM

D.1 The grading

After each stage, the Jury grades the teams evaluating, independently, the written materials and reviews (x), as well as the oral performances together with the participation in the discussion (y). The Jury takes into account not only the scientific understanding of the material, but also the way in which they are presented.

Each juror gives two (x and y) integer marks, for the written and oral part, respectively, from 0 to 10 for the Reporter, the Opponent, the Reviewer, and the Observer[1], according to the table below.

	Written x	Coef. k	Oral y	Coef. l	Final score
Reporter	$0 \le x_{Rep} \le 10$	2	$0 \le y_{Rep} \le 10$	$l_{Rep} \le 3^2$	$S_{Rep} = k_{Rep}x_{Rep} + l_{Rep}y_{Rep}$
Opponent	$0 \le x_{Opp} \le 10$	0.9 or 0.6	$0 \le y_{Opp} \le 10$	2	$S_{Opp} = k_{Opp}x_{Opp} + l_{Opp}y_{Opp}$
Reviewer	$0 \le x_{Rev} \le 10$	0.9 or 0.6	$0 \le y_{Rev} \le 10$	1.2	$S_{Rev} = k_{Rev}x_{Rev} + l_{Rev}y_{Rev}$
Observer	$0 \le x_{Obs} \le 10$	NC or 0.6	$-10 \le y_{Obs} \le 10$	NC or 0.5	$S_{Obs} = k_{Obs}x_{Obs} + l_{Obs}y_{Obs}$

The coefficient on the written reviews is either 0.9 for rounds within 3 stages or 0.6 for rounds within 4 or 5 stages so that (exluding the Observer) each round results in a score out of 100 points for a given team. The oral coefficient of the Reporter l_{Rep} is reduced by 25% for each excessive refusal of a problem (see Procedure for the draws) (3, 2.25, 1.5, 0.75, 0) up to 0.

D.2 The rating

The rating R_n of a team in the round $n \in \{1, 2, 3\}$ is determined as the sum of the average scores by role given by the jurors as follows: $R_n = S_{Rep} + S_{Opp} + S_{Rev} + S_{Obs}$. The total rating of a team is: $R_{Tot} = R_1 + R_2 + (\pi - 2)R_3$ so that the third round (final) is slightly more valuable in the total rate. The final rating of each team is then a non-negative real number from 0 to $100\pi \simeq 314, 159265\ldots$

D.3 The ranking and the pricing

At the end of the Tournament, the SOC will rank the teams according to their rating. The SOC will award the following prizes according to the quality of the teams' performances and ratings:

- 1st prize, 2nd prize, 3rd prize, etc. to emphasise remarkable performances

- (very) honorable mention to reward all the (very) satisfying performances

- certificates to recognise a full participation of the team in the Tournament

D.4 Evaluation grids

The evaluation grids are available on the website. See also Appendix E.

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[1] with the exception that the oral mark y of the Observer is between -10 and 10

E   Evaluation grids interpretation (indications for the Jury)

Reporter - written material (0 to 10) (coeff. 2)

Scientific part

Depth and difficulty of the elements presented (0-3)

- To what extent does the solution cover a large part of the problem? Does it deal with complex issues? Does it present special cases in the absence of results in the general case? Does it address points that go beyond the initial problem?

Presence, accuracy, and correctness of proofs and algorithms (0-3)

- Does the solution present proofs? Are the arguments correct in substance and form? Do they prove the announced result? Do the results proven correspond to what is asked in the problem?

Relevance, efficiency, and elegance (0-1.5)

- Is the adopted point of view appropriate? Could the results proven laboriously have been proven more simply? If tools are introduced, are they used judiciously? If definitions are introduced, are they used judiciously? If definitions deserve to be introduced, are they?

Form

Clarity of reasoning (explanations, examples, illustrations, diagrams, etc.) (0-1.5)

- Does the solution explain what it is trying to do? Are the why and how of this strategy described clearly?

- Does it offer examples or diagrams? Do they illustrate the key points of the reasoning or results?

Presentation (readability, compliance with the format, etc.) (0-1)

- Is the font a good size (11pt)? Is there a cover page with the team name, an abstract, and a table of contents? If the sections are numbered, are they numbered correctly? Are the pages numbered?

- Is the solution easy to read? Are the paragraphs logically arranged?

Reporter − Oral performance (0-10) (coeff. ≤ 3.2)

(total coefficient: $3.2 - 0.8 \times$ penalties)

Oral Presentation

Understanding of the material presented, knowledge and mastery of the mathematical subjects used during the presentation (0-1.5)

- Did the Reporter understand the problem? Do they master all the tools used during the presentation? All the results? Do they make any mathematical errors during their presentation?

NB: This mark is intended to be given at the end of the presentation. In particular, the Reporter's ability to react to questions that go beyond their presentation is not assessed here. Nevertheless, the debates can shed light on the Reporter's understanding and thus allow this mark to be refined.

Relevance of choices (proofs, examples, depth in relation to the written solution) (0-2) The typical pitfalls are the following:

- Deliberately avoiding large parts of one's solution for no good reason (or to maximise one's score on the previous item). Valid reasons are, for example, to focus on more important results, or to have already presented similar reasoning.

- Stringing together results while only staying on the surface throughout the presentation.

- Presenting a (part of) a laborious and uninteresting proof that could have been summarised, such as "We do the calculations and we get...".

- On the contrary, a logical and fluid presentation that highlights its important elements is to be valued here.

Pedagogy and clarity of speech (explanations, illustrations, etc.) (0-1)

- Does the Reporter provide context, rather than jumping straight into answering a particular question? Do they explain their approach before going into the details? Are their results clearly stated? Do they illustrate their reasoning with examples?

Brevity and cleanliness of the presentation (0-1)

- Does the Reporter manage their time well during the presentation? Is the presentation support readable?

NB: Most Reporters should have 1 point on this item.

Debates

Correct answers to the questions asked (0-2.5)

- Does the Reporter understand the questions asked? Are the mathematical statements they produce in response correct? Do they answer the questions well?

Ability to move the debate forward (explaining the limits of one's knowledge, conjectures, live research, etc.) (0-2)

- Does the Reporter simply answer the questions laconically? On the contrary, do they try to develop their answers? If they do not have an answer, are they able to explain why? Do they embark on a research process to try to provide one?

- In particular, if errors are pointed out to them, are they able to measure their impact, and if possible, to correct them?

A Reporter who answers "I don't know" to many questions without saying more should be penalised here. On the contrary, a Reporter who says "I don't know because we tested this and that and it was not conclusive" or "we are stuck on this point to answer this question" should be valued.

Penalties

NB: All penalty points (including for the other roles) are decided separately by the Jury, usually collegially. The rest of the grade is not supposed to be impacted by these elements, except in relevant cases (example: an disrespectful attitude is often associated with a weak ability to move the debate forward).

- NB: One of the objectives of this item is to be mentioned during the debriefing, in order to leave an impression on the Reporter.

- A penalty beyond -2 means a major problem that requires the intervention of the chair of the Jury.

Non-compliance of the presentation with the written material? [-3;0]

- Does the presentation bring anything new compared to the written material, except for possible diagrams? (small penalty) In particular, is there any new plagiarised content? (big penalty)

NB: The objective of this item is to ensure that the Reporter does not present new results that would destabilise the Opponent and the Reporter.

Written reviews (0-10) (coeff. 0.8)

Scientific Part

Critical thinking and perspective on the proposed solution (0-3)

- Is the degree of response to each question well assessed? (NB: the assessment "completely solved" is not appropriate for a question whose answer is given but is incorrect or poorly justified.) Has the summary report correctly identified the level of depth of the solution? Are the general comments correct? Do they correspond well to what was important to note in the solution? Do they allow the overall assessment given to be justified?

Validity of errors and positive points raised (0-2)

- Are the points raised actually errors or positive points? Are they clearly explained? If a correction is made, is it itself correct?

Identifying and prioritising the most important errors and positive points (0-3)

- Have the most important points been raised? Has the importance of the points raised been well assessed? Have they been well prioritised?

Form

Presentation (readability, compliance with the format, etc.) (0-2)

- Does the written review comply with the required format? Is the writing legible?

NB: Most written reviews should have 2 points on this item.

Opponent - Oral performance (0-10) (coeff. 2)

Relevance of questions (importance of the topics covered, points raised) (0-3)

- Do the Opponent's questions allow the central points of the Reporter's solution to be addressed? In particular, if the Reporter has made significant errors, do they address them in order to explain them, or even correct them?

Questioning skills (formulation of questions, reaction to answers, articulation between questions, time management) (0-2)

- Does the Opponent simply ask questions without any logical connection? Or do they try to build on the Reporter's answers, in order to go deeper or to move logically to another point? Do they not hesitate to refocus the Reporter if they stray from the question, or embark on a long and laborious argument?

- Are their questions presented in an interesting way? For example, rather than pointing out errors, do they lead the Reporter to realise them themselves, for instance through an example?

Ability to assess the quality of the Reporter's presentation (presentation and answers to the Opponent) (0-2)

- During their questions, does the Opponent show critical thinking towards the Reporter's answers?

- Above all, is their speech representative of the Reporter's performance?

Answers to the questions of the Reporter and the Jury (substance and ability to move the debate forward) (0-3)

- Does the Opponent understand the questions asked? Are the mathematical statements they produce in response correct? Do they answer the questions well?

- Do they simply answer the questions laconically? On the contrary, do they try to develop their answers? If they do not have an answer, are they able to explain why? Do they embark on a research process to try to provide one?

Ethical behavior [-3;0]

- NB: One of the objectives of this item is to be mentioned during the debriefing, in order to leave an impression on the Opponent.

- A penalty beyond -1 means a major problem that requires the intervention of the president.

Reviewer - Oral performance (0-10) (coeff. 1.2)

Taking the debate to a higher level (through the topics covered, the relevance of the questions asked, the points raised, time management) (0-3)

- If central points have not been addressed by the Opponent, does the Reporter do so?

- Do their questions build on the Opponent's work? In particular, if a point has been left unresolved, do they allow it to be clarified?

- Do their questions lead to interesting discussions?

- Is the time spent on the different parts of the debate consistent with their importance?

Creating a constructive dialogue between the participants (formulation of questions, reaction to answers, articulation between questions, speaking time) (0-3)

- Does the Reporter simply ask questions without any logical connection? Or do they try to build on the answers, in order to go deeper or to move logically to another point? Do they ensure that everyone has a chance to speak, including the Opponent and the Reporter? Do they not hesitate to refocus the Reporter and the Opponent if they stray from the question, or embark on a long and laborious argument?

- Are their questions presented in an interesting way?

Ability to assess the quality of the exchanges (Reporter-Opponent, and three-way) (0-2)

- During their questions, does the Reporter show critical thinking towards the answers of the Reporter and the Opponent?

- Above all, is their speech representative of the exchanges that have taken place?

Answers to the Jury's questions (substance and ability to move the debate forward) (0-2)

- Does the Reporter understand the questions asked? Are the mathematical statements they produce in response correct? Do they answer the questions well?

- Do they simply answer the questions laconically? On the contrary, do they try to develop their answers? If they do not have an answer, are they able to explain why? Do they embark on a research process to try to provide one?

Ethical behavior [-3;0]

- NB: One of the objectives of this item is to be mentioned during the debriefing, in order to leave an impression on the Reporter.

- A penalty beyond -1 means a major problem that requires the intervention of the chair.

Observer - Oral performance $[-10; 10]$ (coeff. 0.5)

- Does the Observer point out a precise issue of the reported solution? $[-5; 5]$

- Is the Observer clear in the reason why it is a crucial issue of the Debate that let the reported solution become irrelevant? $[-5; 5]$

F   Model for the written review

A model for the written review of the current year is available on the website. The model may change slightly from one edition to another.