Prominent Article en Français!

Les Activités mathématiques à Montréal

Je crois que l'on peut maintenant dire que la ville de Montréal est devenue l'un des centres mathématiques les plus importants au Canada.

L'un des sujets les mieux représentés à Montréal est sans aucun doute la théorie des nombres. Cette branche des mathématiques est l'une des plus anciennes, néanmoins elle suscite toujours autant d'intérêt de la part des mathématiciens. A toutes les deux semaines, le jeudi, se tient lieu le séminaire de théorie des nombres qui rassemble plusieurs mathématiciens. Les conférenciers invités traitent des sujets spécialisés comme les courbes elliptiques, la théorie algébrique et analytiques des nombres, formes modulaires et automorphes, etc.… De nombreuses personnes assistent à ces séminaires. Dans la plus part des cas, il s'agit d'étudiants gradués et de professeurs de mathématiques provenant du milieu universitaire Montréalais. Mais il y a aussi des professeurs et des étudiants venant d'autres universités, comme par exemple, l'université de Queens, d'Ottawa et du Vermont.

Il faut admettre que Montréal est un endroit de prédilection pour organiser de tels événements. Avec ses quatre universités soient : l'UDM (Université de Montréal), l'UQAM (université du Québec à Montréal), Concordia et McGill, on ne pourrait espérer un meilleur endroit. Evidemment, il n'y a pas que la théorie de nombres au menu à Montréal Par exemple, l'analyse et l'algèbre sont d'autres sujets très bien représentés. Pour ceux qu aiment les mathématiques appliqués à la science et la biologie, Montréal est certainement une destination de choix.

Une des institutions les plus importantes à Montréal est l'ISM (l'institut des sciences mathématiques). Cette institution est un consortium de six universités québécoises (Concordia, Laval, McGill, UDM, UQAM et université de Sherbrooke.) Ses activités sont nombreuses : programme de bourses d'excellence, bourses postdoctorales, coordination de cours avances, organisation de colloques hebdomadaires, séminaires pour les étudiants etc.… Il est à remarquer que l'ISM est financée par le ministère de l'éducation du Québec et par les six universitaires membres. Si vous voulez en savoir plus sure cette institution voici son adresse électronique :

http://www.math.uqam.ca/ISM/ .

A mon avis, l'activité la plus intéressante est les séminaires pour les étudiants gradués. Ces séminaires sont très accessibles et servent d'introduction à certains sujets spécialisés. A chaque mardi, un étudiant fait un exposé sur un sujet qui l'intéresse. A la fin de chaque exposé, des amuse-gueule et de la pizza sont offerts. Laissez moi vous dire que l'ambiance qui y règne est très conviviale.

Une autre institution très importante qui siège à Montréal est le CICMA (Centre interuniversitaire en calcul mathématique algébrique) qui joint les universités de McGill, Concordia, Laval et l'UDM. Cette institution coordonne plusieurs projets de recherches cojoints que vous pouvez allez consulter a l'adresse électronique suivante :

http://cicma.mathstat.concordia.ca .

De plus, cette organisation attribue certaines subventions à des étudiants afin de leur permettre de faire une maîtrise, un doctorat ou un post-doctorat sur un sujet spécialisé.

Pour terminer, le milieu mathématique à Montréal est en pleine effervescence. A chaque semaine, avant, pendant et après les conférences un bouillonnement d'idées s'empare d'une communauté qui vit au rythme de son imagination et sa créativité. Si vous êtes passionné par les mathématiques, si vous voulez faire partie d'une communauté qui partage les mêmes intérêts que vous et que vous voulez relever un nouveau défi, Montréal vous attend !

We thank Hugo Chapdelaine de l'université McGill for contributing this article.

CMS Student Committee Report

Committee Chair Update

This past June the CMS Student Committee (Studc) experienced its second change of members. We are happy to report that Studc has (yet again) energetic and active members.

The following people are members of Studc.

* Dan Piché, the founder and past chair of Studc, is working on helping make CUMC a success! He is trying to put together an operations manual so that CUMC runs smoothly every year. He is also working on an operations manual for Studc activities so that each transition of members goes smoothly. Great work Dan!

* Antoine Khalil is the editor of this newsletter. This is Antoine's first issue. We wish to take this moment to thank Antoine and congratulate him on such a wonderful issue! If you have any comments for Antoine please email him directly at student-editor@cms.math.ca.

* Youness Lamzouri is spearheading our regional conferences project. The goal of this project is to support a number of student activities across the country. If you are planning an activity and need funding, contact student-funding@cms.math.ca.

* Krista Galway is working on our teaching in elementary and high schools project. Krista is busy learning about the requirements to be a mathematics teacher in various provinces in Canada.

* Boris Reitman is our Webmaster. Boris did a wonderful job in developing a new framework for the CUMC website. This contribution will be a great asset for the current and future organizers of CUMC. Check out our Web page
http://www.cms.math.ca/Students
If you have any comments, contact Boris at student-webmaster@cms.math.ca

* Renato Dedić is busy working on a promotional poster with Dr. McDonald and the Canadian Mathematical Society Education Committee.

The promotional poster is actually a Web page! Check out

http://mathcentral.uregina.ca/HumanFace/careers/quilt/

* Joy Abramson is the chair of the organizing committee for CUMC (to be held at Toronto University) this summer. Please stay tuned to the March 2003 newsletter for exact dates. We are sure that CUMC this year will be another huge success. We take this opportunity to thank Andy Culham, who organized the past CUMC at Calgary. Great job Andy!

We would like to take this moment to thank our past committee members, in particular Dan Piché. Your hard work and enthusiasm is what made Studc the committee it is today!

If you have any feedback on our activities, or if you have any projects that you feel would be of interest to Studc, please send us an email at

chair-studc@cms.math.ca

Sincerely,

Susan Cooper and Robert Juričević

Co-Chairs, CMS Student Committee

HomePlay

Previous Problem:
(March 2002 Newsletter)

Prime Gap Problem:

Prove that for every natural number M, there exists an even number $2k$, such that there are more than M pairs of successive prime numbers with difference $2k$.

Solution:
(This solution is by Davies, 1984. The solution may be found on page 251 and page 252, *The New Book of Prime Number Records* by Paulo Ribenboim.)

Consider the sequence of prime numbers

$$3 = p_2 < p_3 < \cdots < p_n,$$

and the $n-2$ differences

$$p_{i+1} - p_i,\ i = 2,\ldots,n-1,$$

for n sufficiently large.

First note that all prime numbers in the sequence above are odd so the difference between any two of them will be an even number. Second, observe that if the number of distinct differences is less than the greatest integer less than or equal to $\frac{n-2}{M}$, denoted by $\left[\frac{n-2}{M}\right]$, then one of these differences, say E, would appear more than M times and we are done.
So, suppose the number of distinct differences is more than $\left[\frac{n-2}{M}\right]$. Then

$$p_n - p_2 \geq 2(1+2+\cdots+(n-2)/M)$$
$$= 2(\frac{1}{2}((n-2)/M)((n-2)/M+1)$$

The right hand side is asymptotically equal to $\frac{n^2}{M^2}$, while the left hand side is asymptotically equal to $n \ln n$ by the Prime Number Theorem, a contradiction.

New Problem:

Bertrand's Postulate via Paul Erdös:

(a) Show that the binomial coefficient $\binom{2n}{n}$ is an even integer for all positive integers n.

(b) Use part (a) to show there is a prime number p between n and $2n$ (Bertrand's Postulate) for all integers $n \geq 2$.

The *Student Mathematical Communicator* is produced by the

CMS Student Committee

It is distributed to all math departments in Canada. Please address correspondence to

student-editor@cms.math.ca

The opinions expressed in the *Student Mathematical Communicator* are not necessarily those of the CMS Student Committee and its members, or of the Canadian Mathematical Society. Unless otherwise stated, all submitted material is the property of the *Student Mathematical Communicator*. Editors reserve the right to make final editing decisions. Comments should be sent to the contact address given above.

The Student Mathematical
Communicator

Published by the CMS Student Committee

December 2002. Volume 4 http://www.cms.math.ca/Students

Math Olympiad

Congratulations CANADA!

The Canadian team won one gold medal, three silver medals, and one bronze medal at the 43rd International Mathematical Olympiad in Glasgow, UK. The competition was held between the 19th and 30th of July 2002.

The team was made up of six students. Canada ranked 12th out of 84 participating countries. Dr. Graham Wright (Executive Director of the Canadian Mathematical Society) noted that this is the best result for Canada since it started participating in the contest!
The 44th IMO is to be held in Tokyo, Japan between July 7th and 19th, 2003.
For more details please check

- http://www.cms.math.ca/MediaReleases/2002/imo2002res
- http://imo.math.ca

The William Lowell Putnam Contest

The Sixty-Second Annual William Lowell Putnam Mathematical Contest was held on Saturday, December 1st, 2001.
The University of Toronto team and the University of Waterloo team received honorable mentions. Congratulations to both teams!

For the latest details on the contest please check: http://math.scu.edu/putnam

CMS Meeting

The Canadian Mathematical Society (CMS) winter meeting was a success! The CMS Student Committee hosted a fun evening for attending students at Griffin's on Saturday night.

Want to find out what Canadian mathematicians do for a living? Learn more about our Student Committee?

The CMS summer meeting will be held at the University of Alberta, Edmonton, June 14th to 16th 2003.

CHECK OUT:
http://www.cms.math.ca/Events/summer03

Need money to get there? Email

gradtravel-s03@cms.math.ca

The deadline for requests is May 1st 2003. (You could also maybe ask your math department for support!)

Happy Birthday CUMC

This year is the 10th anniversary of the Canadian Undergraduate Mathematics Conference (CUMC). York University will be hosting the event between May 27th and June 1th 2003.

Are you an undergraduate student in mathematics? Want to see Toronto?

Contact Joy at cumc@cms.math.ca for more information.