

 **Asian Technology Conference in Mathematics**  
*An enjoyable and instructive conference*

Cher(e) collègue

C'est avec un grand plaisir que je vous invite à assister gratuitement à la présentation sous Zoom que je donnerai en anglais dans le cadre de la 25<sup>ème</sup> conférence ATCM (<http://atcm.mathandtech.org>). Le programme provisoire est disponible à l'URL <http://atcm.mathandtech.org/EP2020/program.html>.

L'identifiant de ma présentation est **870 979 4059 (mot de passe : atcm2020)**; je la donnerai le mercredi 16 Décembre 2020 à 17h heures de Paris. Zoom sera donc l'outil de téléconférence utilisé pour cette conférence en distanciel. Une aide pour installer et utiliser le logiciel avant la conférence est disponible à l'adresse

<http://atcm.mathandtech.org/EP2020/ATCM2020ZoomAccess.pdf>

Je vous recommande vivement d'installer le plugin de Zoom avant la conférence.

J'ai hâte de vous retrouver pour ma présentation. N'hésitez pas à me contacter si vous rencontrez un quelconque problème ([jjdahan@wanadoo.fr](mailto:jjdahan@wanadoo.fr))

Très cordialement

**Jean-Jacques DAHAN**

**Responsable du groupe de Géométrie Dynamique**

**De l'IRES de Toulouse**

---

**Titre de la présentation :**

**The Role of Technology to Build a Simple Proof: The Case of the Ellipses of Maximum Area Inscribed in a Triangle** (Le rôle de la technologie pour concevoir une démonstration « simple »: le cas des ellipses d'aire maximum inscrites dans un triangle)

**Résumé:**

We know that there is a unique ellipse inscribed in a triangle and passing through the midpoints of its sides. This ellipse is known as the Steiner ellipse. Among the properties of this special ellipse, one states that it is the ellipse of maximum area inscribed in a triangle. The first complete proof of this property was given in 2008 by Minda and Phelps. Their proof uses lots of properties of complex numbers and especially the complex forms of some transformations. When I read this proof for the first time, I was unpleasantly surprised by its complexity. From this moment, I worked on an approach of this property using dynamic geometry and Computer Algebra System. My aim was initially to find investigations that could lead to this property. I was successful but what was astonishing is that I could build a proof of this property following the stages of the previous investigations. This paper will describe first, how the investigations conducted with technology led to the expected conjecture and secondly how a simpler proof could be built in translating with CAS the stages of the investigations. This process is really unusual because, it is known that there is a gap between the conjecture and the proof in an experimental process of discovery mediated by technology (or not). The story of this research will give an example of bridging the stage of conjecture and the stage of proof. We will also have the opportunity to show how the possibilities of a software can influence our constructions and the way to conduct our proofs: here we will conduct a backward reasoning which is the core of the simplification provided by my proof. As usual in any research work, we will give some extra results met during our investigations (construction of all ellipses inscribed in a triangle, simple constructions of isoptics...).