

First name :

Andreas

Last name :

Christiansen

Personal title :

Associate Professor

Affiliation :

University of Bergen

Preliminary title : Mathematical reasoning in trigonometric proofs in early 19th century textbooks **Abstract :** I will in this presentation compare the mathematical reasoning used in two textbooks in trigonometry published in 1834 and 1837, from Norway and Denmark. Bernt Michael Holmboe (1795–1850) was professor in mathematics in Norway, and wrote most of the textbooks in mathematics that were used in the Norwegian learned schools between 1825 and 1860, and he was a very influential person in the development of school mathematics in this period. He wrote several textbooks in various mathematical disciplines, among them a textbook in plane and spherical trigonometry (Holmboe, 1834). Christian Ramus (1806–1856) was professor in mathematics in Denmark, and wrote several textbooks in mathematics between 1837 and 1855, the first one being his textbook in trigonometry (Ramus, 1837). Their ways of proving even the most basic results are very different, and I will as an example present in detail their proofs for the sine and cosine of sums and differences of angles. Holmboe's proof is an algebraic proof, while Ramus' proof is purely geometric. The trigonometric lines are geometric objects, so Ramus is presenting his proof in a Euclidian tradition. There is of course no absolutely correct way to present a proof, but whoever the reader is, the proof should present the logic of the proof as clearly as possible. It is therefore an interesting question if that is done

best using an easily understandable algebraic proof, or using a rather complicated geometric proof. What type of proof is best suited to answer the reader's question "Why"? Mathematical reasoning is an important topic in the present research in mathematics didactics. A presentation showing very different ways of arguing and demonstration fairly basic results in trigonometry will hopefully be of relevance to the body of knowledge of the History of Mathematics Education. References
Holmboe, B.M. (1834). Plan og sphærisk Trigonometrie. C.L. Rosbaum, Christiania. Ramus, C. (1837). Trigonometrie indeholdende den elementære Theorie af de trigonometriske Linier tilligemed Anvendelse paa de plane og sphæriske Trianglers Opløsning. Universitetsboghandler C.A. Reitzels Forlag, Kjöbenhavn.