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Isaac Beeckman a-t-il démontré la loi des cordes vibrantes selon laquelle la fréquence est inversement proportionnelle à la longueur? (French) [[Did Isaac Beeckman prove the law of vibrating strings according to which frequency is inversely proportional to length?]]

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In his journal in 1615 Isaac Beeckman gave an argument for why the frequency of a vibrating string is inversely proportional to its length. (The journal was only published in an edition that appeared in the period 1939–1953.) To investigate this argument, the author of the paper under review presents a model from modern dynamics to analyze the motion of the string. The model is intended to be one that is closer to Beeckman's original intention than the usual modern derivation using the wave equation. Beeckman's reasoning is considered in reference to this model and the associated dynamical analysis.

It should be noted that the model proposed by the author is not a dynamically feasible one; that is, a string in which the mass is continuously distributed will not undergo motion in which its configuration at each instant is an equilateral triangle. It would be possible to modify the model, say by supposing that all the mass is concentrated in a central body joined to the endpoints by elastic massless strings. In this case we find that the speed of the body is proportional to $i_m \cos \omega t$, where i_m is the maximal angle of deviation and ω is a constant. ω will vary from string to string, being a function of the length of the string. It is clear, however, that two strings in which i_m is the same will have the same distribution of velocities throughout the motion.

Does an understanding of the author's model and his accompanying analysis contribute substantially to an historical appreciation of Beeckman's reasoning? Each reader will have to decide this question for himself. It is clear that Beeckman was supposing that the speed of the string is variable. It is also true that he did not have a method for analyzing accelerated motion. The primary interest of his argument is in providing an example of physical reasoning in the period before dynamics was invented.

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