On the Role of the Second Membrane of the Tabla

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ABSTRACT

The tabla is an Indian percussion instrument that is remarkable in many ways, in particular because its first partials are harmonic thanks to the black patch at its center. This harmonic quality makes it desirable for the sound to have a very long decay time as it produces a nice sustain which is particularly striking: contrary to the drum set, for which drummers have a tendency to damp their instrument, the tabla player will always look for a good sustain.

When watching a tabla, the second characteristic that catches the eye after the black patch is the presence of an annular shaped membrane breaded at the outer edge of the principal one. The two membranes are not attached to each other except at the rim, and they can easily be separated from each other. In fact, it is customary for tabla players to insert a thread between the two to have a “brighter sound and a better sustain”. This assertion suggests that this second membrane, and in particular the disconnection between the two during the vibrations, may be the reason why the tabla have such a long decay time.

In this article, we first present measurements made on a tabla showing the separation of the membranes during the vibration. We then propose a model for the drum head of the tabla consisting of the two membranes together with the kettle, coupled by a nonlinear collision force. A numerical scheme approaching this model is then introduced and calibrated so that it replicates the data obtained by the experiments, thus giving an explanation for the increased sustain.