Introduction

The study of $\mathcal{L}$-duality of ~~Fins~~ Lagrange and Finsler spaces was initiated by R. Miron ([11]) around 1980. Since then many Finsler geometers studied this topic.

One of the ~~main~~ remarkable results obtained ~~is~~ are the concrete $\mathcal{L}$-duals of a Randers and Kropina metrics ([4]). However, the importance of $\mathcal{L}$-duality is by far limited to computing the dual of some Finsler fundamental functions.

Very recently ([12]) the complicated problem of classifying Randers metrics of constant flag curvature was solved by means of duality. Other geometrical problems of (α,β)-metrics might be solved in future by considering not the metric it self, but its $\mathcal{L}$-dual.

The concrete examples of $\mathcal{L}$-dual metrics are quite few ([3,4]). In the present paper we succeeded to compute the dual of another well known (α,β)-metric, the Matsumoto metric. Surprisingly, despite of the quite ~~heavy~~ complicated computations involved, the obtained Hamiltonian function by means of four quadratic forms on T^*M and a 1-form. This metric is completely new and it brings a new idea ~~[illegible]~~ about $\mathcal{L}$-duality. The dual of an (α,β)-metric can be given by means of several quadratic forms on T^*M and 1-forms constructed ~~by means of the~~ only with the Riemannian metric coefficients $a_{ij}(x)$ and the 1-form coefficients $b_i(x)$.