Hydrodynamical model for capillary oscillations of sessile drop

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The exact solution of capillary oscillation problem for free and sessile droplets forms the base for the liquids surface tension determination by the dynamic methods [1–3]. Such analytical solution for free spherical nucleus have been used to extract the viscosity of hadronic matter from nuclei data [4]. In this work, the capillary oscillations of a sessile droplet with fixed or mobile contact line is considered. Within the framework of the polynomial expansion method for surface displacements from the equilibrium position, a system of equations were constructed and solved for normal oscillation modes. For the fixed contact line, a comparison with the solution of the integro-differential equation obtained in work [5] was made.

Acknowledgments
This work was supported by grant from the Russian Foundation for Basic Research (No. 18-02-01042 A).

[1] Noblin X, Buguin A and Brochard-Wyart F 2009 *Eur. Phys. J. Special Topics* **166** 7–10
[2] Sergeev I N, Khokonov A K and Akhmatov Z A 2020 *J. Phys.: Conf. Ser.* **1556** 1–8
[3] Sergeev I, Khokonov A K and Akhmatov Z A 2019 *Proc. of the Kabardino-Balkarian State University* 4 **9** 17–25
[4] Khokonov A K 2016 *Nuclear Physics A* **945** 58–66
[5] Strani M and Sabetta F 1984 *J. Fluid Mech.* **141** 233–47