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Numerical and mathematical approaches to analyses of water-circulator-induced flow in ponds TAKASHI NSKAZAWA, HIROSHI SUITO, Graduate School of Environmental Science, Okayama University, Japan — Pollution and muddiness of natural and artificial reservoirs that are used to supply water irrigation have become important problems in recent years. A rotating propeller operating at low speed set on a lake surface is proposed because it is expected that the device can induce vertical circulating flow by the centrifugal force. Although various experiments have shown clearly that the water quality in a lake is improved by operation of such equipment, the flow mechanism is not fully understood. This study is intended to characterize vertical circulating flow resulting from the propeller's action. To survey such a fluid motion numerically and mathematically in simple systems, the flow induced by the top boundary condition which forces a horizontal rotating flow is investigated here. Simulations of flows created by the top boundary condition are carried out to obtain steady-state solutions with various Reynolds numbers and aspect ratios.

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