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- [2] S. N. Biswas and T. S. Santhanam, "Coherent states of para-Bose oscillators", *J. Austral. Math. Soc. Ser. B* **22** (1980) 210–217.
- [3] F. H. Busse, "On the mean field problem of thermal convection", *Max-Planck Inst. Phys. Astrophys. Rep. MPI-PAE/Astro* **31** (1970) 1–31.
- [4] E. M. Casling, "Slender planing surfaces", Ph. D. Thesis, University of Adelaide, 1978.
- [5] R. H. Day, "Adaptive process and economic theory", in *Adaptive economic models* (eds R. H. Day and T. Groves), (Academic Press, New York, 1975) 1–38.
- [6] J. W. Miles, "Resonant response of harbors (the harbor paradox revisited)", *Proc. 8th Symp. Naval Hydro.* (1970) 95–115.

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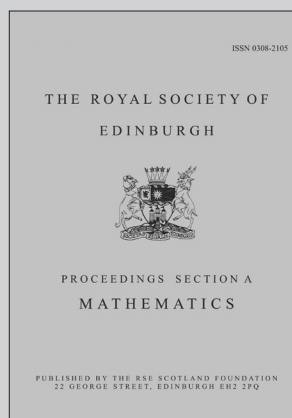
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