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Nusselt number and bulk temperature in turbulent Rayleigh–Bénard convection EBERHARD BODENSCHATZ, STEPHAN WEISS, OLGA SHISHKINA, Max Planck Institute for Dynamics and Self-Organization, INTERNATIONAL COLLABORATION FOR TURBULENCE RESEARCH COLLABORATION — We present an algorithm to calculate the Nusselt number (Nu) in measurements of the heat transport in turbulent Rayleigh–Bénard convection under general non-Oberbeck–Boussinesq (NOB) conditions (Shishkina, Weiss, Bodenschatz, Phys. Rev. Fluids, 2016). We further critically analyze the different ways to evaluate the dependences of Nu over the Rayleigh number (Ra) and show the sensitivity of these dependences to the reference temperatures in the bulk, top and bottom boundary layers (BLs). Finally we propose a method to predict the bulk temperature and a way to calculate the reference temperatures of the top and bottom BLs and validate them against the Göttingen measurements (Ahlers, He, Funfschilling, Bodenschatz, New J. Phys., 2012).

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