

# Some applications of a representation of the Dedekind sum

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**Abstract.** The classical Dedekind sum is defined for positive integers  $c$  and  $d$  by

$$s(d, c) = \sum_{j=1}^c \left( \left( \frac{j}{c} \right) \right) \left( \left( \frac{dj}{c} \right) \right),$$

with

$$((x)) = \begin{cases} 0, & \text{if } x \in \mathbb{Z}, \\ x - [x] - \frac{1}{2}, & \text{otherwise.} \end{cases}$$

Several different representations of the sum not directly involving the function  $((x))$  have been discovered. In this work, we apply a particularly elegant representation due to W. Zhang to derive new representations for the classical Dedekind sum as well as an analogue of the Dedekind sum. We also prove a mean value result for an analogue of the Dedekind sum.

