

# The spherical mean value operator for functions supported in a ball

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Let  $B$  be the unit ball in  $\mathbb{R}^n$  and  $S$  its boundary. Define  $\mathcal{M} : C_0^\infty(\overline{B}) \rightarrow C^\infty(S \times [0, \infty))$  where

$$(\mathcal{M}f)(p, r) = \frac{1}{|S|} \int_{|\theta|=1} f(p + r\theta) d\theta$$

represents the mean value of  $f$  on a sphere of radius  $r$  centered at a point  $p \in S$ . We discuss the injectivity, the range, and inversion formulas for  $\mathcal{M}$ . We also discuss a connection between the inversion of  $\mathcal{M}$  and an inverse problem for a hyperbolic PDE. These results are based on joint work with David Finch, Sarah Patch and Markus Haltmeier.