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Archimedean Cones in Vector Spaces

In the case of an ordered vector space (briefly, OVS) with an order unit, the Archimedeanization method was recently developed by V. I. Paulsen and M. Tomforde [Vector spaces with an order unit, Indiana Univ. Math. J. 58(3) (2009) 1319–1359]. We present a general version of the Archimedeanization which covers arbitrary OVS. Also we show that an OVS (V, V_+) is Archimedean if and only if

$$\inf_{\tau \in \{\tau\}, y \in L} (x_\tau - y) = 0$$

for any bounded below decreasing net $\{x_\tau\}_\tau$ in V , where L is the collection of all lower bounds of $\{x_\tau\}_\tau$, and give characterization of the almost Archimedean property of V_+ in terms of existence of a linear extension of an additive mapping $T : U_+ \rightarrow V_+$.

Keywords: Ordered vector space, Pre-ordered vector space, Archimedean, Archimedean element, almost Archimedean, Archimedeanization, Linear extension.

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