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The nil radical of an Archimedean partially ordered ring with positive squares

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Abstract: Let R be an Archimedean partially ordered ring in which the square of every element is positive, and $N(R)$ the set of all nilpotent elements of R. It is shown that $N(R)$ is the unique nil radical of R, and that $N(R)$ is locally nilpotent and even nilpotent with exponent at most 3 when R is 2-torsion-free. R is without non-zero nilpotents if and only if it is 2-torsion-free and has zero annihilator. The results are applied on partially ordered rings in which every element a is expressed as $a = a_1 - a_2$ with positive a_1, a_2 satisfying $a_1a_2 = a_2a_1 = 0$.

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