

# Arithmetic, geometric, and harmonic means for accretive-dissipative matrices

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The concept of Loewner (partial) order for general complex matrices is introduced. After giving the definition of arithmetic, geometric, and harmonic mean for accretive-dissipative matrices, we study their basic properties. An AM-GM-HM inequality is established for two accretive-dissipative matrices in the sense of this extended Loewner order. We also compare the harmonic mean and parallel sum of two accretive-dissipative matrices, revealing an interesting relation between them. A number of examples are included.

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