

## Faithful linear representations of bands

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A semigroup  $S$  such that  $a^2 = a$  for every  $a \in S$  is called a band. The main motivating problem for this talk is to find conditions on a band  $S$  in order that  $S$  embeds into the multiplicative semigroup  $M_n(F)$  of  $n \times n$  matrices over a field  $F$  for some  $n \geq 1$ . It is known and easy to show that this is always the case if  $S$  is a rectangular band (that is, a semigroup satisfying the identity  $xyx = x$ ), but this is no longer true in general (that is, in case the band  $S$  has at least 2 rectangular band components). The following related problem will be also discussed: when the semigroup algebra  $K[S]$  of a band  $S$  over a field  $K$  is embeddable into  $M_n(A)$  for a commutative algebra  $A$ ? Certain general results will be proved and some concrete embeddings will be constructed. This talk is based on a joint work with Ferran Cedó.