Majorana and axial representations in GAP - Additional problems

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If you have already finished the main problem sheet from the Majorana algebras tutorial then the following then the following are additional problems that you can try that would be useful contributions to the `MajoranaAlgebras` package. They are in increasing order of (probable) difficulty.

1. Implement a function that performs the following:

   Arguments a Majorana representation `rep`

   Returns an integer n such that `rep` is n-closed but is not k-closed for any $k < n$.

2. Implement the function `SumIntersectionMat` (GAP manual 24.11) for sparse matrices (and make it perform faster than the current GAP function).

3. Implement a function that performs the following:

   Arguments a Majorana representation `rep` such that `rep.innerproducts` is not bound;

   Returns a list that represents a Frobenius form on `rep` (in the same way that `rep.innerproducts` usually does, otherwise returns false.

   Hint: this function will look similar to `MAJORANA_FindInnerProducts` but will probably also need inner product values from the dihedral algebras that are stored in the record `MAJORANA_DihedralAlgebras`.

4. Implement the function `MAJORANA_LDLTDecomposition` for sparse matrices (and make it perform faster than the current function). This function is not documented (sorry) but notes on the algorithm can be found at `https://madeleinewhybrow.files.wordpress.com/2016/03/decompositions.pdf`.