

**Theoretical assignments day 4**

1. Assume exact arithmetic. Can BiCG and QMR be faster than GMRES in terms of numbers of iterations? Note that BiCG and QMR use two matrix-vector products per iteration, and GMRES one.
2. Same question for CGS and BiCGSTAB.
3. Can CGS and BiCGSTAB be more than two times faster than GMRES in terms of numbers of iterations?
4. Fill the table below.

Method	Applicable to which matrix class	Optimal in which sense	Orthogonality condition residuals	Short recurrences (yes/no)
CG				
MINRES				
FOM				
GMRES				
BiCG				
QMR				

Table 1: Taxonomy of iterative methods