Comparison of the Three Methods

**Method I:** based on the Jordan Canonical Form; cf. Theorem 5.
- find $P$ such that $J = P^{-1}AP$ is a \{diagonal Jordan\} matrix; then $f(A) = Pf(J)P^{-1}$. (Use the formula of Theorem 7 to compute $f(J)$.)
- good for diagonable matrices, but usually not practical for non-diagonable matrices.

**Method II:** based on the Cayley-Hamilton Theorem; cf. Theorem 8.
- find $r(t) = \text{rem}(f, \text{ch}_A)$; then $f(A) = r(A)$. (To compute $r(t)$, use long division (if possible) or the method of substitution or the remainder formula.)
- drawback: one still has to compute $r(A)$ by the naive method.

**Method III:** based on the Spectral Decomposition Theorem; cf. Theorem 12.
- find the constituent matrices $E_{ik}$ by substituting suitable divisors of $\text{ch}_A(t)$ into the spectral decomposition formula.
- usually the best method.