Accelerating Any EM Algorithm Without Sacrificing Simplicity and Stability

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New Classes of Methods for EM Acceleration

- Developed two new classes of iterative schemes.
- Consider EM as a fixed-point iteration: $\theta = F(\theta)$
- STEM: extension of Steffensen's method for scalar fixed-point problem
- SQUAREM: novel idea of "squaring" combined with STEM
- SQUAREM more efficient than STEM (3 to 30 fold acceleration in our examples).

Simple, Stable and General

- Easy to implement - require only EM updating function (vectorized parameter).
- No evaluation of L_{obs}, Q, grads, hess.
- Accelerate **any** linearly convergent scheme (e.g., ECM, ECME, gradient EM)
- Generally non-monotone, but are easily globalized (stabilization and steplength pruning)
- General and automatic (no problem-specific considerations).
- Ideal "off-the-shelf" method for EM acceleration in large and complex statistical problems.
- A simple R function is available