Convergence of Polynomial Restart Krylov Methods

$$\mathbf{Ax} = \mathbf{x}\lambda$$

ARPACK = EIGS in Matlab

A - may be nonsymmetric

Arnoldi / Lanczos

Krylov Subspace Projection

Implicit Restart

Arnoldi + Implicit QR

CVD Reactor Stability – SANDIA

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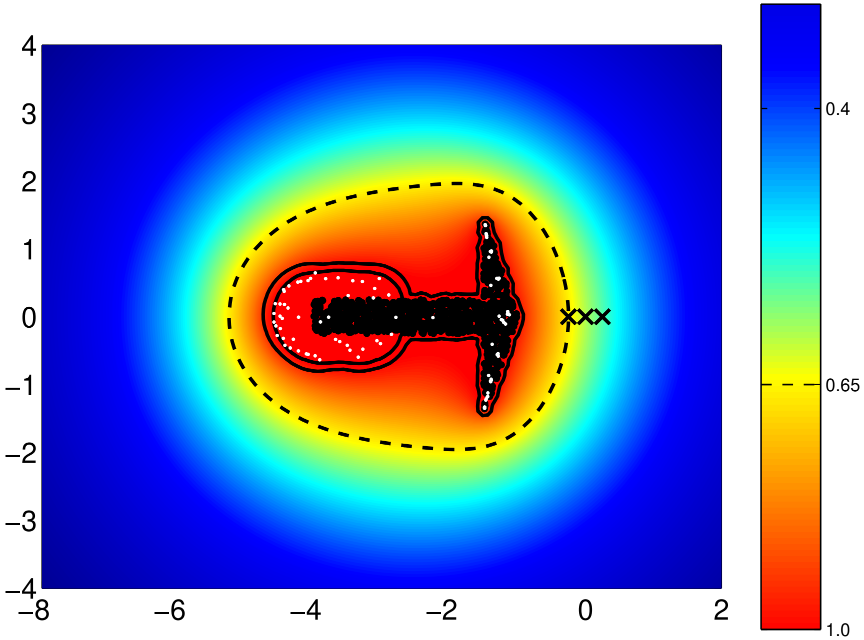
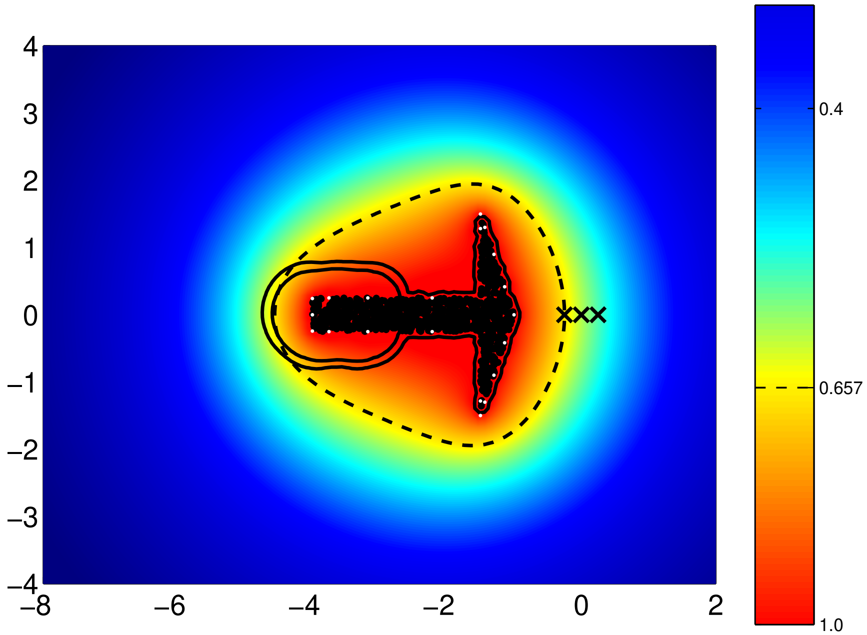
Used P_ARPACK on Sandia-Intel Tflop
1024 processors .

- **16 Million variable** FEM 3D Model of CVD Reactor
  Computed 6 eigenvalues of largest real part

Convergence for Restarting with High Non-normality

Beattie, Embree and S. in SIREV 05





These plots show the magnitude of the aggregate exact shift polynomial (left) and the degree-20 Fejér polynomial (right).