Reduced-order modeling for cardiac conductivity estimation

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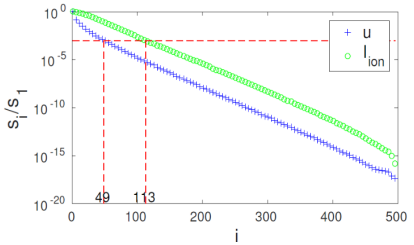
- Models in electrocardiology strongly sensitive to the cardiac conductivities
  - Inverse problem challenging due to high computational burden

MODEL-ORDER-REDUCTION TECHNIQUES TO
(a) LIGHTEN THE COMPUTATIONAL COST OF FORWARD SOLVER (b) SPEED UP THE INVERSE CONDUCTIVITY PROBLEM

POD: solution represented with few DOFs
+
DEIM: tackle the nonlinearity

$$\mathbf{u} = \sum_{i=1}^{N} U_i \varphi_i$$



Terrific reduction of computational cost!

	Exact cond.	Est. cond.	Exe. time
Full order	[5.5,3]	[5.53,3.06]	12870 s
POD+ DEIM	[5.5,3]	[5.38,3.05]	246.6 s

References
(1) H.Yang,A.Veneziani. "*Efficient estimation of cardiac conductivities via POD-DEIM model order reduction*." Applied Numerical Mathematics 115 (2017): 180-199.
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