2D extension of SCSD

Objective

SCSD : New method for fast 3D convolutions

Internship + CEMRACS : Extend to 2D

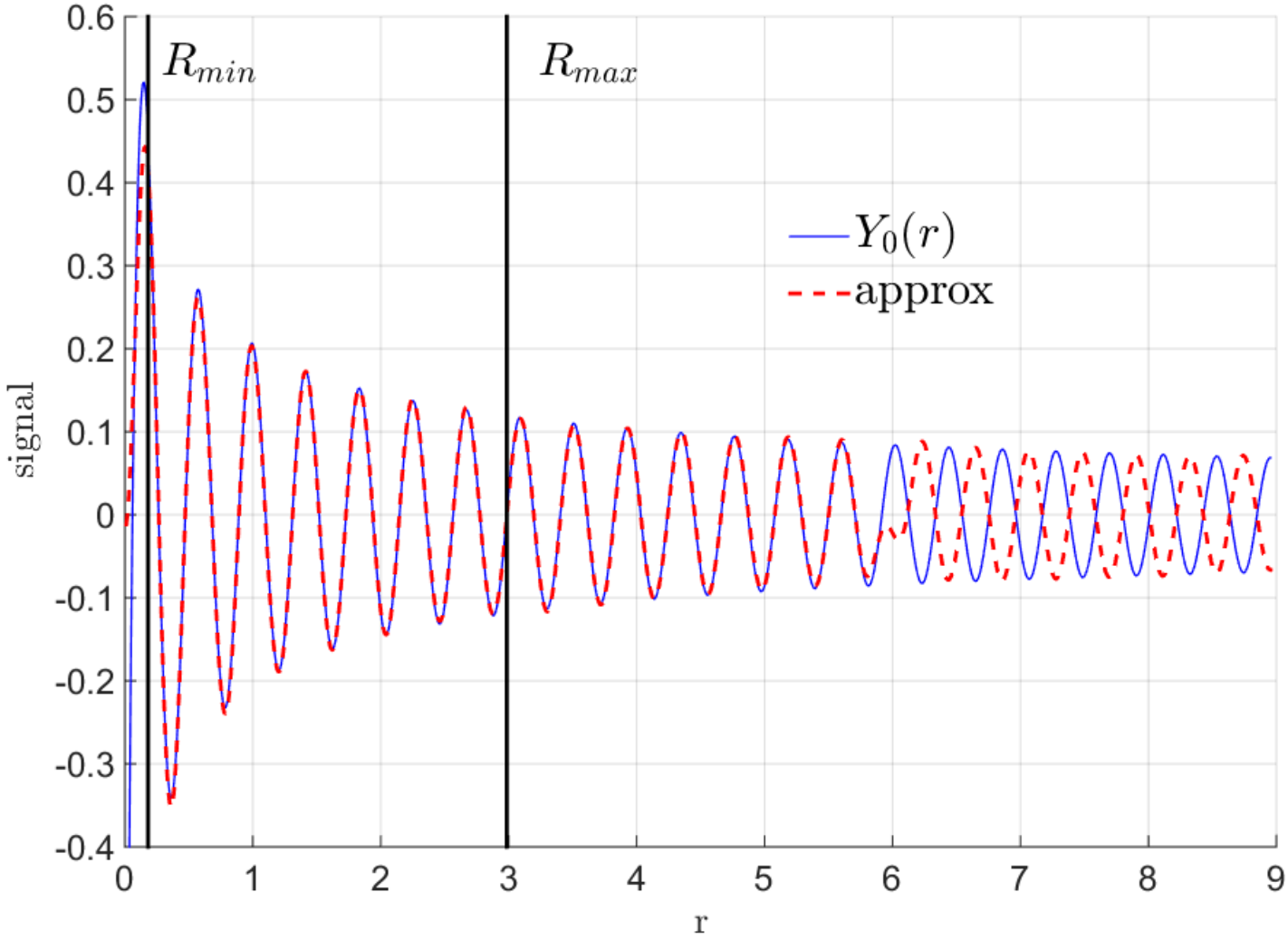
$$q_k = \sum_{l=1}^{N} G(x_k - x_l) f_l \quad G(x) : \text{ PDE radial kernel}$$

	SCSD ($3D \to x_k \in \mathbb{R}^3$)	SBD ($2D \to x_k \in \mathbb{R}^2$)
Expansion :	$G \approx \sum_{p=1}^{P} \alpha_p \text{sinc}(\lambda_p \lvert x \rvert)$	$G \approx \sum_{p=1}^{P} \alpha_p J_0(\rho_p \lvert x \rvert)$
Offline :	$O(N \log(N))$	$O(N^{3/2})$
Online :	$O(N \log(N))$	$O(N \log(N))$

Achieved

- Error + complexity analysis
- Test case 5e7, off : 21 min, on : 6 min

Approximation of Y_0 in Bessel series



Numerical results