Thesis Outline – the problem of axisymmetric BOR

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1.1

What is an axisymmetric surface of revolution? Why are these type of densities useful and sought after?

2

What is a modal Green's function? What is translation invariant kernel? What are the problems associated with this?

3

Why is an analytic FMM for a modal Green's function difficult? The problem with evaluating special functions – Bessel or Hankel functions.

4

So we're left to kernel-independent methods.

5

Why not use the typical KIFMM from Ying, Biros, and Zorin? Pre-computation is not optimal because of translation operators.

6

We now consider using the black-box FMM or a Chebyshev interpolation-based scheme. Consider that for each mode n, the computation of the weights is simply a matrix $W_{m_1,m_2} = \sum_{j=1}^{N} \sigma_j R_n(\overline{\mathbf{y}}_{m_1,m_2}, \mathbf{y}_j)$