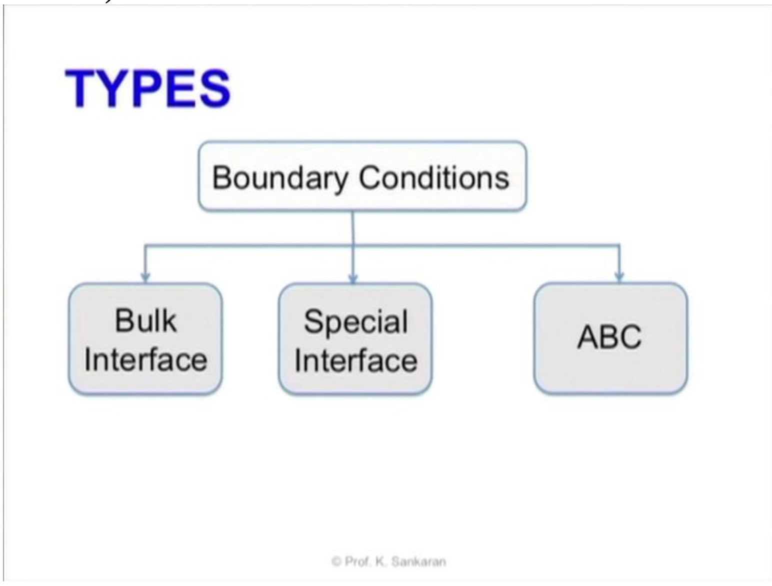
Computational Electromagnetics and Applications
Professor Krish Sankaran
Indian Institute of Technology Bombay
Summary of Week 4

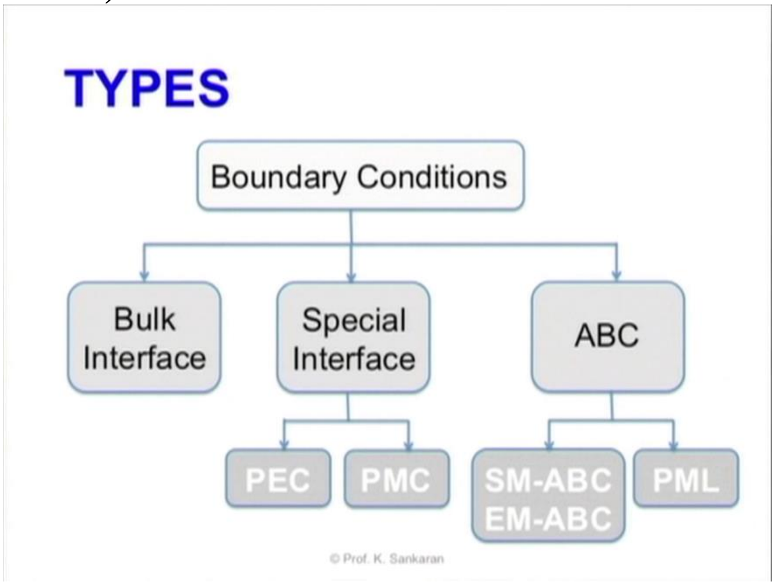
This week we looked into boundary truncation techniques starting with the motivation we discussed some of the commonly employed boundary conditions in numerical simulations.

(Refer Slide Time: 00:28)



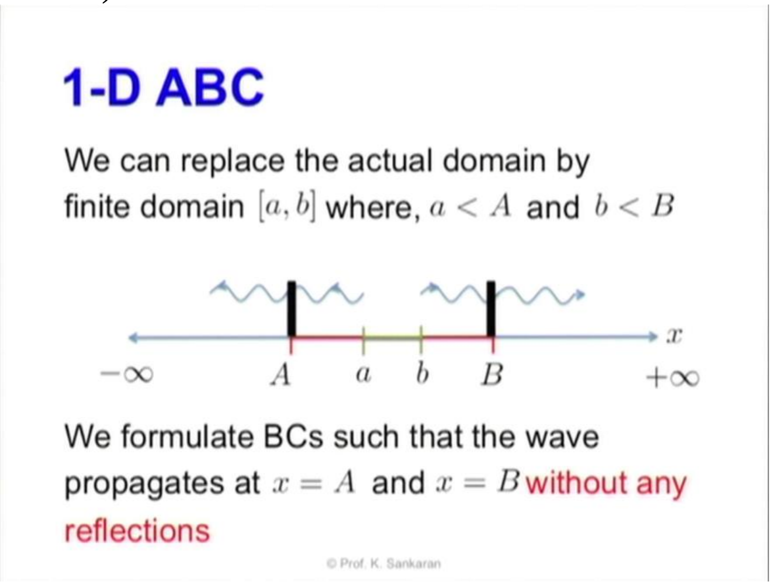
This includes bulk interface special interface and absorbing boundary conditions

(Refer Slide Time: 00:38)



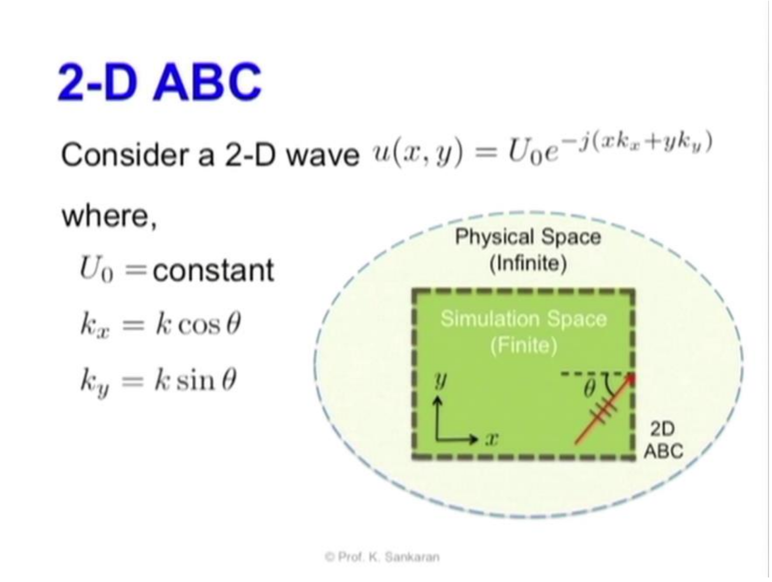
Under special interface condition we studied perfect electric and perfect magnetic conductor boundary conditions.

(Refer Slide Time: 00:48)



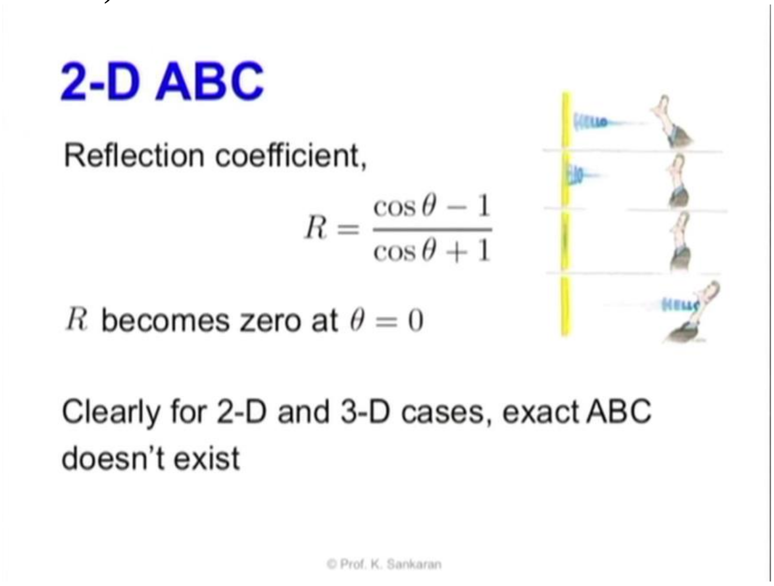
We studied both one dimensional and the

(Refer Slide Time: 00:54)



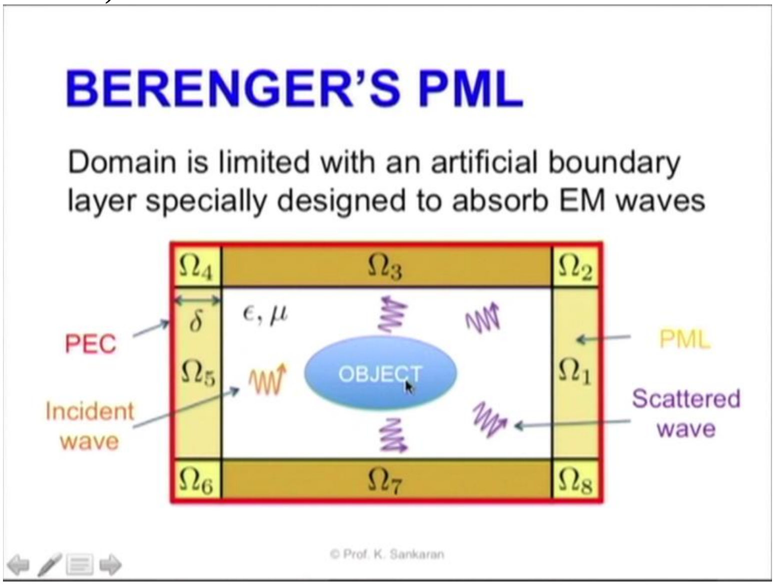
Two dimensional mathematical formulations of Engquist Majda absorbing body conditions

(Refer Slide Time: 01:00)



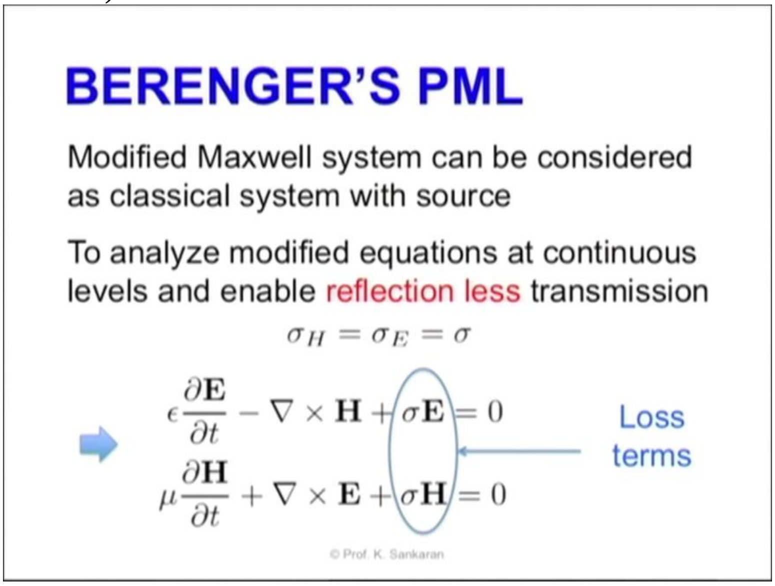
Paying special attention to the respective reflection Coefficients calculations.

(Refer Slide Time: 01:02)



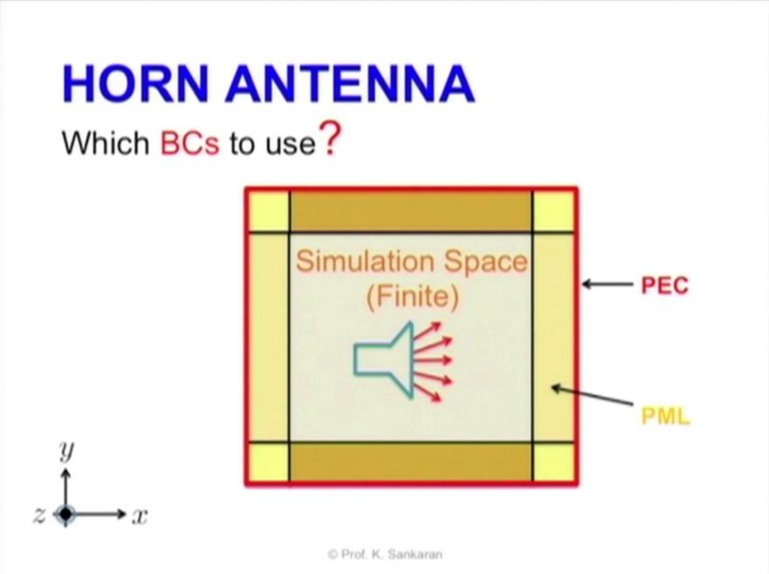
Later we introduced the mathematical formulation for the famous Berouger perfectly matched technique.

(Refer Slide Time: 01:15)



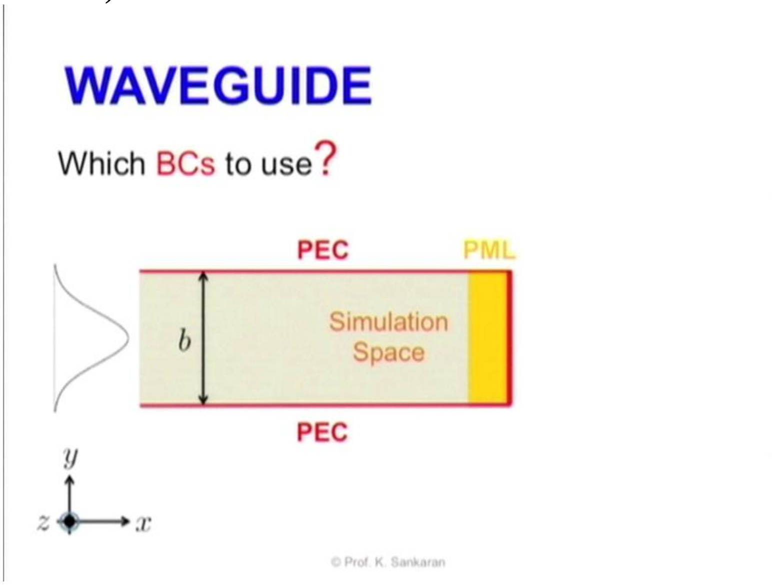
We examined the role of Loss E terms in the update equation and how one can optimise these losses for equipped PML performance.

(Refer Slide Time: 01:38)



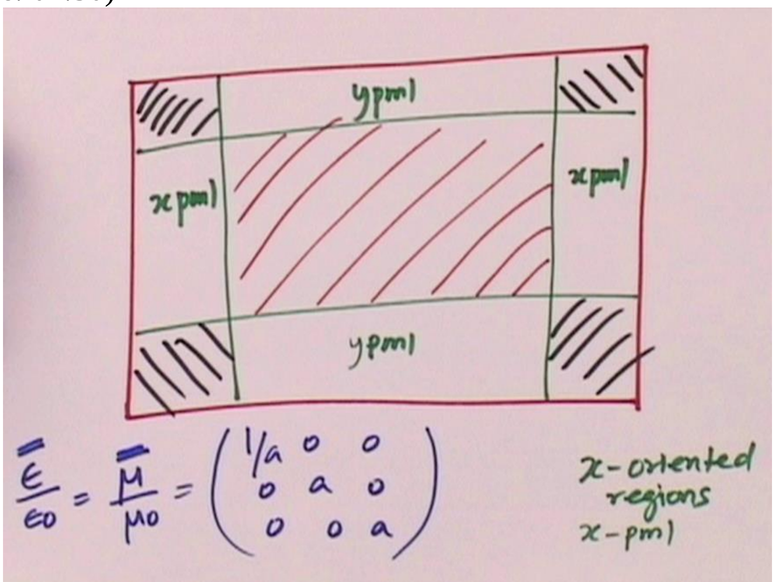
We demonstrated that epicacy and accuracy of the PML technique for a couple of practical applications namely horn antenna.

(Refer Slide Time: 01:43)



And waveguides simulations.

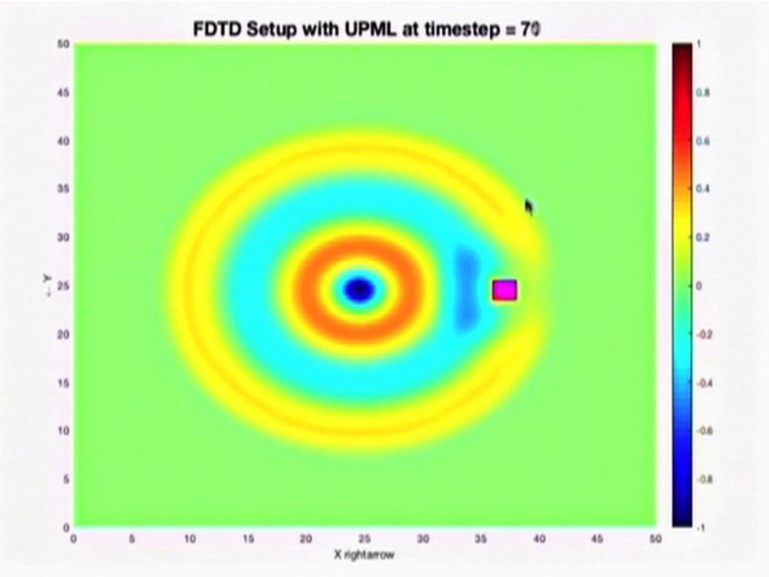
(Refer Slide Time: 01:50)



Following this we discussed at length the mathematical formulation of the uniaxial perfectly matched layer technique and we also discussed its advantages over classical Bererger perfectly matched layer technique.

We ended this week’s lecture with the numerical simulations to test the accuracy of uniaxial simulations.

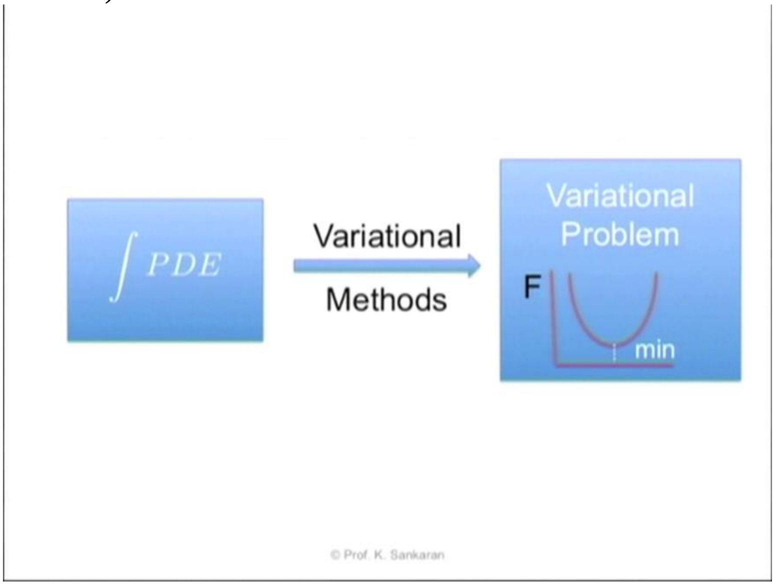
(Refer Slide Time: 02:15)



As an example we demonstrated using scattering applications with a point source incident on a scatterer.

With this we have come to the end of finite difference technique that we have discussed in the last few weeks.

(Refer Slide Time: 02:30)



In the next modules we will introduce variational methods which is the basis for final elements and the method of moments.

Please practice the examples and simulations that we discussed this week post your questions on the forum and get ready for the next week until then Goodbye.