

Lecture Notes on partial differential equations

These four lectures follow a basic introduction to Laplace and Fourier transforms.

Emphasis is laid on the notion of initial and boundary problems which provides a wide receptacle to many engineering disciplines.

Many exercises are framed into a particular discipline, in order to show to the student that the methods exposed go over the basic academic manipulations. The point is not to ‘ethnicize’ the mathematical tools, but rather to show that the same tools are in fact used by several disciplines, although with different jargons. This fact in itself highlights the powerfulness of the tools.

Moreover, the various branches of physics provide rich issues that are a feast to applied mathematicians. It would not be wise not to take advantage of their variety.

Therefore, examples borrow from the various fields that are taught in this unit, namely strength of materials, elasticity, structural dynamics, wave propagation, heat diffusion, compressible and incompressible fluid mechanics, free surface flow, flow in porous media, particle flow, transport engineering, and electrical engineering.

References

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