

# Tentative Syllabus for the Workshop(23-12-2024 to 27-12-2024)

1. Introduction Sobolev space and weak formulation of elliptic partial differential equations.[Prof. Prof. Prosenjit Roy]
2. Divergence form equation  $[\text{Div}(A_{ij}D_ju) = f]$  where  $A_{ij}$  is a uniformly elliptic matrix.[Prof. Adi Adimurthi]
  - (a) : Local boundedness of the subsolution[Subsolution estimate]
  - (b) Moser Weak Harnack inequality
  - (c) 2(a)+2(b) implies Holder continuity of solutions.
3. Non-Divergence form equation( $A_{ij}D_{ij}u = f$ ) where  $A_{ij}$  is a uniformly elliptic matrix.[Prof Karthik Adimurthi and Dr.Ram Baran Verma]
  - (a) ABP Maximum principle[Alexandroff Bakelman- Maximum Principle]
  - (b) Weak Harnack inequality for nonnegative supersolution
  - (c) Weak Maximum principle[Subsolution estimate]
  - (d) 3(b)+3(c) implies Harnack inequality and Holder continuity of solutions.

## References:

- [1] Han, Qing, and Fanghua Lin, Elliptic partial differential equations. Vol. 1. American Mathematical Soc., 2011.
- [2] David Gilbarg, and N. S. Trudinger, Elliptic partial differential equations of second order. Vol. 224, no. 2. Berlin: springer, 1977.