All-around Analysis

1. Let be a harmonic function on a smooth open domain in . Prove the following:
2. Mean Value property: For any , such that ，it holds that
3. Harnack inequality: Assume that . For any compact subset of , positive constant , such that

where is independent of

1. State and prove the maximal principle for
2. Assume is an analytic function in the neighborhood of , and

with and

1. If . Construct an analytic function

such that .

1. If , is there an analytic function of near identity such that