

## Notes for Lecture #6

### Complete function expansion methods for solving Poisson and Laplace equations

As an example, consider the 2-dimensional Laplace equation in the square lattice discussed in Lecture notes#5. It can be shown that a series solutions takes the form:

$$\Phi(x, y) = \sum_{n=0}^{\infty} 4V_0 \frac{\sin[(2n+1)\pi x/a] \sinh[(2n+1)\pi y/a]}{(2n+1)\pi \sinh[(2n+1)\pi]} \quad (1)$$

Refer to the beginning of the maple file lecture5.mws to see plots of  $\Phi(x, y)$  for 2 different summations of the series.