

Combinatorial Analysis (MTH G232) – Spring 2007

Time: Mondays & Wednesdays 3:30–5:00 pm
Place: 509 Lake Hall
Instructor: Egon Schulte (469 Lake, 373–5511, schulte@neu.edu)
Reference Text: R.A.Brualdi, *Introductory Combinatorics*,
4th edition, Prentice Hall (2004).

Course Outline

- (1) Introduction. What is (enumerative) combinatorics? [B 1]
- (2) Basic counting rules (bijections, permutations, combinations) [B 3]
- (3) Binomial and multinomial coefficients [B 5]
- (4) Inclusion-exclusion principle [B 6]
- (5) Möbius Inversion [B 6.6]
- (6) Occupancy problems [B 8.2]
- (7) Differences [B 8.2]
- (8) Ordinary generating functions (formal power series) [B 7]
- (9) Partitions
- (10) Linear recurrence relations [B 7]
- (11) Catalan numbers [B 8.1]
- (12) Exponential generating functions [B 7.7]
- (13) Pigeon Hole Principle, and Ramsey Theorems [B 2]
- (14) Marriage Theorem, and Matchings [B 9]
- (15) Combinatorial designs (Steiner systems) [B 10]
- (16) Permutation groups [B 14]
- (17) Pólya's Theorem [B 14]

Additional References

R.P.Stanley, *Enumerative Combinatorics (Volume 1)*,
Wadsworth & Brooks/Cole (1986).

F.S.Roberts and B.Tesman, *Applied Combinatorics*, 2nd Edition,
Pearson Prentice Hall (2004).