Lec 8/22

Sunday, August 12, 2018 20:17

For friday: Read at least 8 pages, maybe 11

Magic Squares

8	1	6
3	5	7
4	9	2

Sums along rows/columns/diagonals all same.

ex: there is only one 3x3 magic square (up to what?)

16	3	2	13
5	10	11	8
9	6	7	12
4	15	14	1

880 4x4 magic squares

36!

ex: need practically same # of operations (multiplications) to compute $AB, A^2, A^{-1}, \det A$

ex: Can magic square # (eg 15, 34) ever be prime. no: $\frac{n^2(n^2+1)}{2n} \Rightarrow \frac{1}{2} n(n^2+1)$

$P(n)$ = # of partitions of n. is there a general formula?

Yes: Hardy / Ramanujan. Important for S_n & young diagrams.

method of generating fns: $f(q) = \sum_{n=0}^{\infty} P(n) q^n$

- Indian prosody & Fibonacci #s.

- find other interesting examples of fibonacci #s.

$$A = \begin{pmatrix} 1 & 1 \\ 1 & 0 \end{pmatrix}, \quad A^2 = \begin{pmatrix} 2 & 1 \\ 1 & 0 \end{pmatrix}, \quad A^n = \begin{pmatrix} u_{n+2} & u_{n+1} \\ u_{n+1} & u_n \end{pmatrix}$$

ex: Calculate first few convergents of $\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cdots}}}$