

## MATH 508

### Padé approximation (part of assignment 4)

- (a) Given that  $\tanh(z) = z - \frac{1}{3}z^3 + \frac{2}{15}z^5 + \cdots$ , construct *by hand* the type  $[2, 2]$  Padé approximant for  $\tanh(z)$  at the origin.
- (b) Use Maple to construct Padé approximants of type  $[m, m]$ , where  $m = 1, \dots, 8$ . Make a table that shows in each case the maximum error in the approximation for real  $z$  between  $-1$  and  $1$ , and the locations of the poles in the approximants. Do you see any logic in how the poles behave?