

18.747: Problem set 3; due Thursday, February 28

1. Prove formula (4.53) in Kac-Raina.
2. Prove formula (4.57b) in Kac-Raina.
3. Prove formulas (4.60) and (4.63) in Kac-Raina.
4. Prove that any highest weight representation of gl_∞ admits a unique contravariant form, i.e. a symmetric bilinear form such that $(E_{ij}v, w) = (v, E_{ji}w)$. Show that this form is nondegenerate if and only if the representation is irreducible.