

# Problem Sheet on K3 surfaces and IHSM

## Lecture 4

- (1) Prove that the quasi pull-back

$$F_l = \frac{\Phi_{12}(Z)}{\prod_{\{\pm r\} \in R_l} (r, Z)} \Big|_{D_{L_{2d}}^\bullet}$$

has weight  $12 + N_l$  where  $N_l = |R_l|/2$ .

- (2) Use the embedding of  $4A_1$  in  $E_8$  to find other vectors of length  $2d$  with  $2d \leq 143$  and  $2 \leq N_l \leq 12$ .
- (3) Describe an embedding of  $A_3$  into  $E_8$  and compute  $(A_3)_{E_8}^\perp$ .
- (4) Use such an embedding of  $A_3$  into  $E_8$  to find vectors  $2d$  with  $N_l = 14$  (e.g. for  $d = 42$ ).