

Birzeit University  
Department of Physics  
Mathematical Physics, Phys330  
Fall 2020  
Homework 2: Due date Oct. 5th 2020

1. Show that if A and B are matrices which do not commute, then  $E^{A+B} \neq e^A e^B$
2. A linear operator Q is defined if the following conditions hold:

$$Q(A + B) = Q(A) + Q(B)$$

$$Q(kA) = kQ(A)$$

k is a scalar number, A and B are numbers, vectors, functions and so on.

- (a) Show that the square root is not a linear operator.
  - (b) Is the determinant of a matrix a linear operator?
3. Problem 11,12,15 and 17 section 9
  4. Problem 18,25 and 26 section 11
  5. Problem 8 section 15