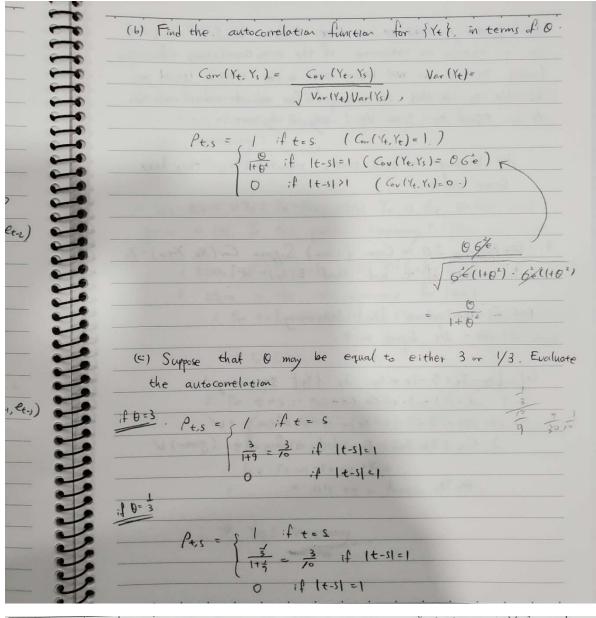
```
2. (Exercise 2.4 in Cryenfichan). Let fly be a zero-mean white noise process with a variance denoted by Ge2. Suppose that the observed process is Yt=Pt+Det-1, where O is some constant value.

(a) Find the auto covariance function for fYt1, in terms of O.

(Hint. Remember to consider all possible combinations of Sandt; when they are equal, when they are lunk apart, etc).

Yt=Pt+OPt-1.
```

```
(Dif t= S: Cov (Yt, Ys) = Var (Yt) = Var (Pt + OPt-1)
                                                                     = Var(et) + 02 Var(et+) = 6e + 026e = 6e(1+02)
@ if |t-s|=1
     Cov (Yt, Ys)= Cov (Yt, Yt1) = Cov (Et+6Pt1, Et-1+19Et-2)
     Cov (Re, Pt.) + (9(Px, Pt.2) + (9 Cov (Pt.1, Pt.1) + (9 Cox(Pt.1, Pt.2)
   = 0 Var (Pt-1) = 06e
 3 if |t-51 >1
      Cov (Ye, Ys) = Cov (Ye, Ye) = Cov (Pe+0Pe+, Pt-2+0Pe+3)
      = Cov(ex, et.2) + 6Cov(et., et.3) + 6 Cov(et., et.2) + 02 Cov(et., et.)
      Tt, s = 5 6e (1+62) if t=s
                06e
                          if 1+-51=1
                           if 1t-51>1
                6
```



(d) Suppose you observe a time series 37,72, -, Yn and use it obtain an estimate of the auto correlation function (using methods we will learn later in the course). Would you be able to use this estimate of Pt,s to determine whether O is equal to 3 or 1/3? Why or why not?

No, because in both case, when It-51=1, they have same value.