

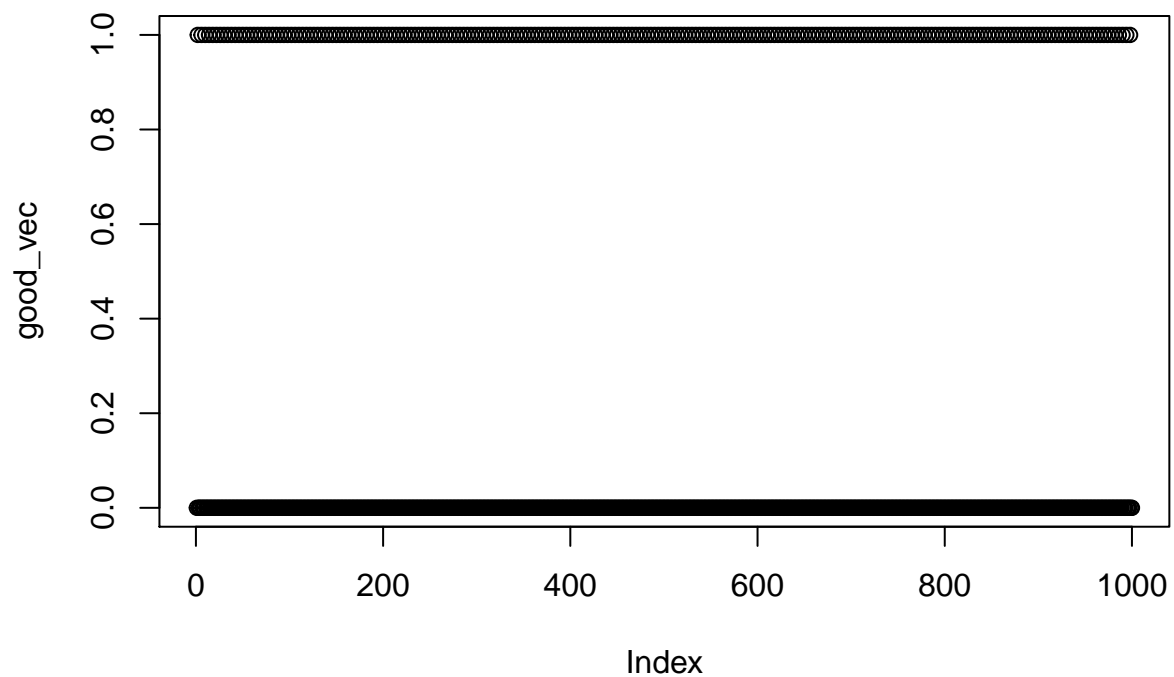
# Stepwise Correction

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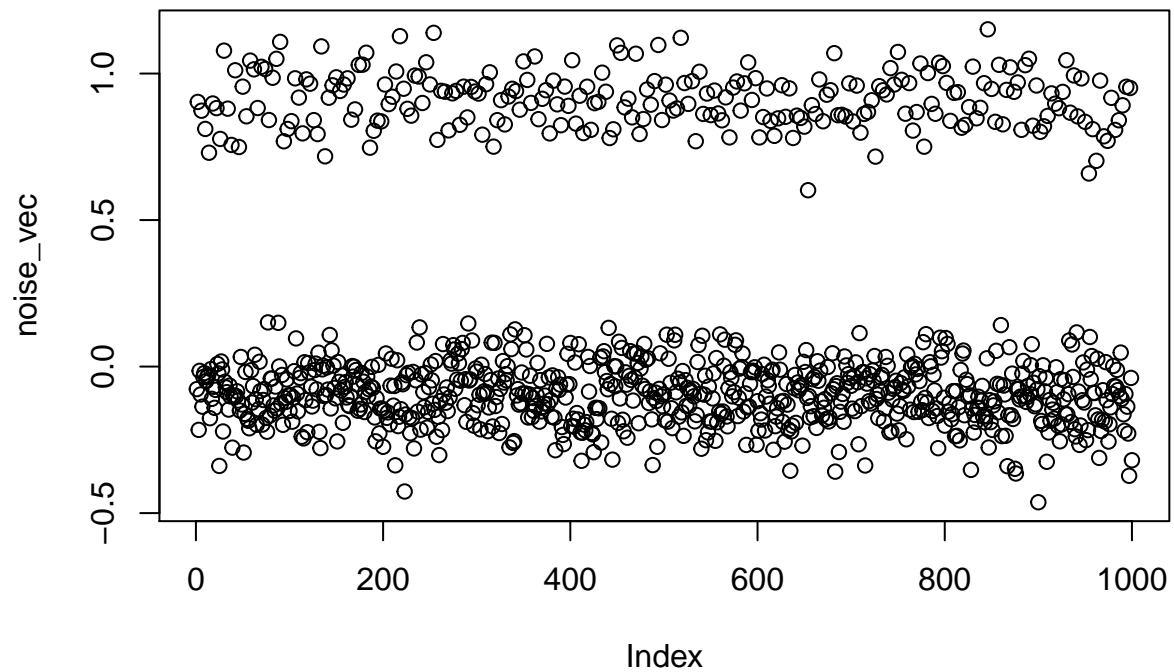
## Fabricate some on-off data

```
len=1000  
  
good_vec=rep(c(0,1,0,0),len/4)  
plot(good_vec)
```



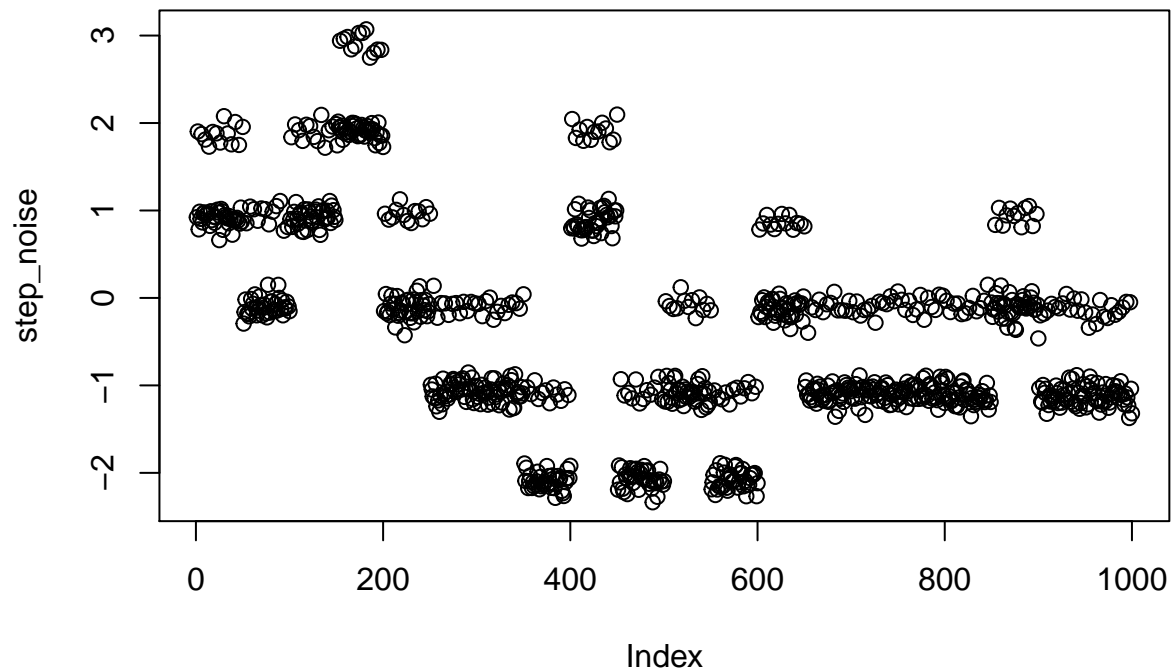
## Give it noise

```
noise=rnorm(len,-.1,.1)  
noise_vec=good_vec+noise  
plot(noise_vec)
```



Introduce some “step noise”

```
steps=round(rnorm(20,-1,1))
t=apply(steps,function(x) x*rep(1,50))
steps_10=NULL
for(i in 1:ncol(t)) steps_10=c(steps_10,t[,i])
step_noise=noise_vec+steps_10
plot(step_noise)
```

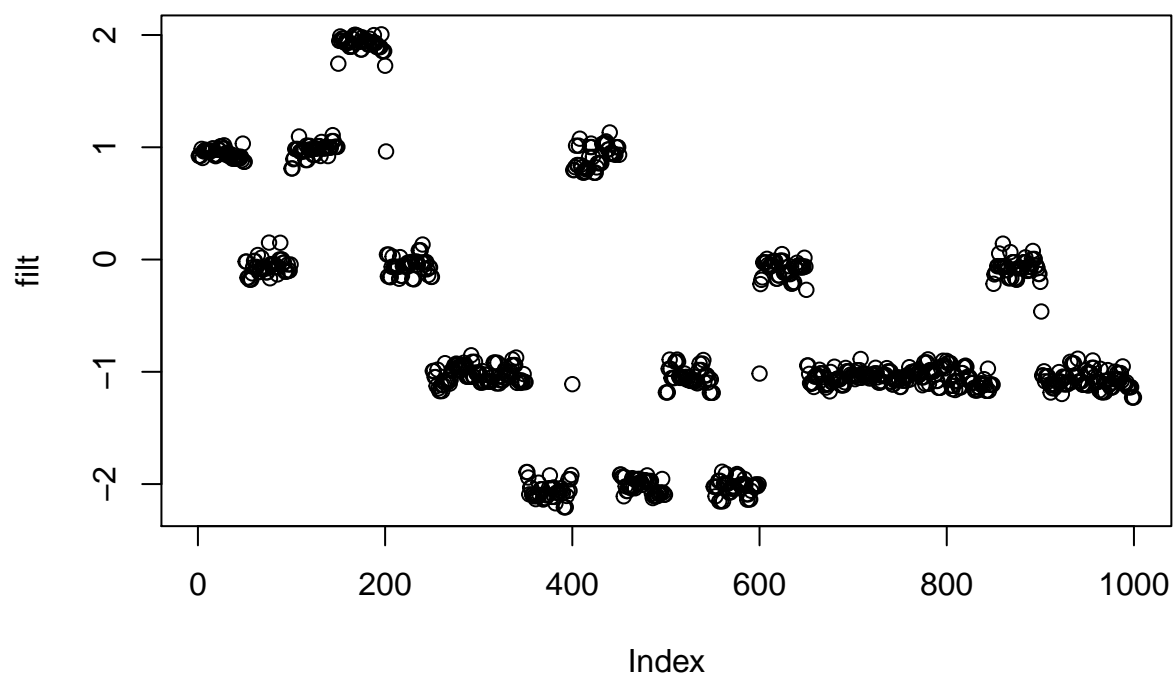


Try to fix using moving median

```
filter_window=5
filt=runmed((step_noise),filter_window)

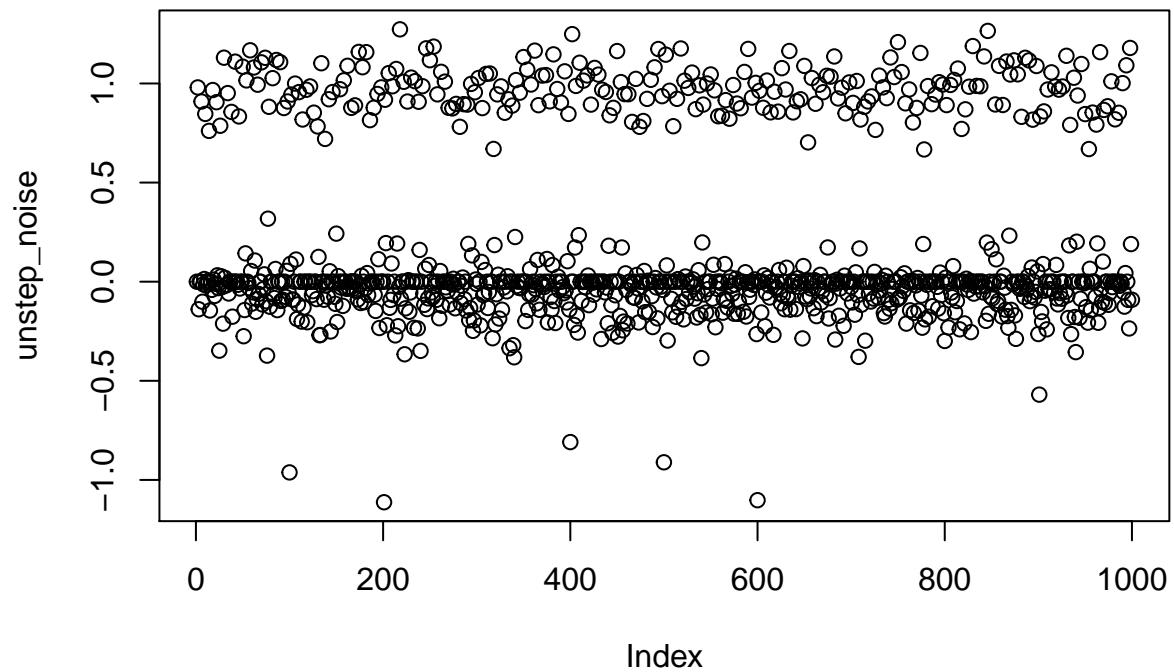
plot(filt)
title("Note the averaging issue between steps")
```

**Note the averaging issue between steps**



```
unstep_noise=step_noise-filt  
plot(unstep_noise,type="p")  
title("Attempted adjustments")
```

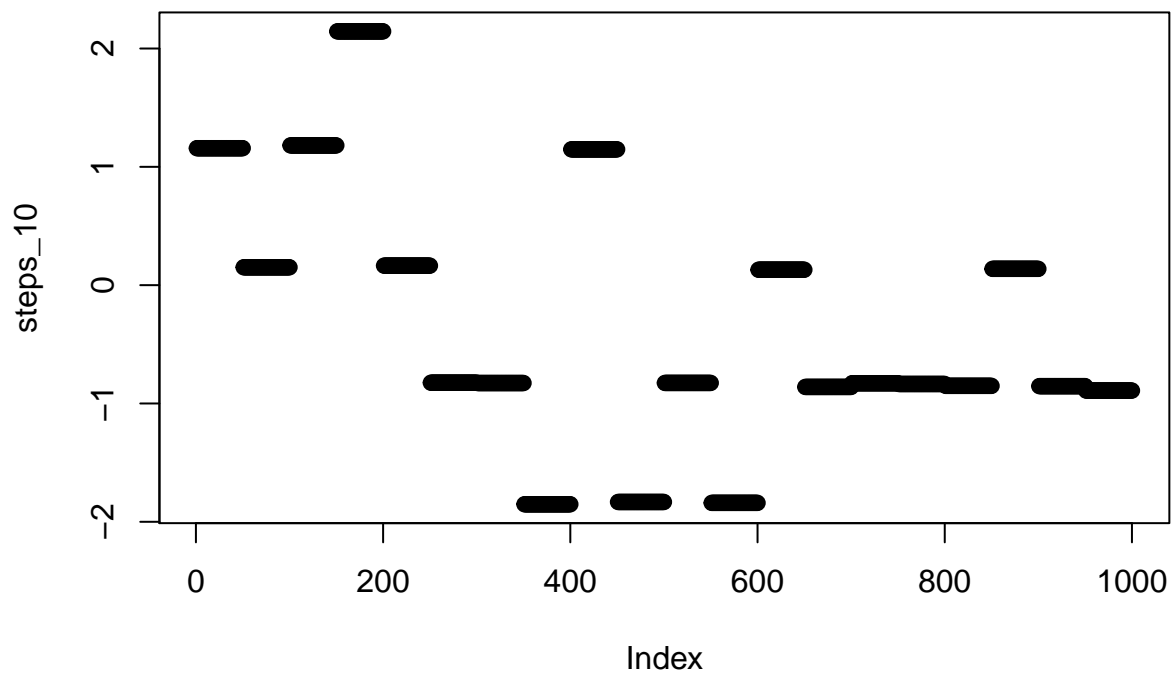
## Attempted adjustments



## Fit a step function fit

```
df=data.frame(x=1:len,y=step_noise)
fit=lm(df$y~0+cut(df$x,20))

step_fit=as.vector((coef(summary(fit))[,1]))
t=sapply(step_fit,function(x) x*rep(1,50))
steps_10=NULL
for(i in 1:ncol(t)) steps_10=c(steps_10,t[,i])
plot(steps_10)
```



```
unstep_noise=step_noise-steps_10  
plot(unstep_noise)  
title("Much better")
```

**Much better**

