# Adjust covariance matrix D

*2019-12-15*

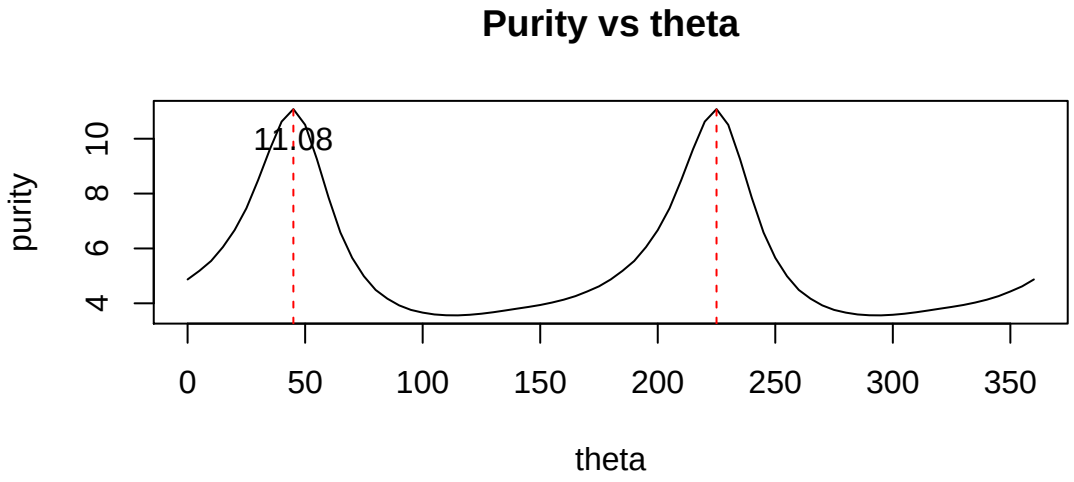
If we replace $D$ with $D^* = D + I$, the combination of the max purity will not change.

**Simulation**

$n = 100, p = 2$. The $D_1, D_2$ used the matris from EMBARC study. $\Gamma_1 = (0, 1, 0), \Gamma_2 = c(0, \frac{1}{2}, \frac{\sqrt{3}}{2})$. True $\alpha_0 = (\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$.

Draw the relationship between purity and the $\theta \in (0, 2\pi)$, where $\alpha = (\sin(\theta), \cos(\theta))$

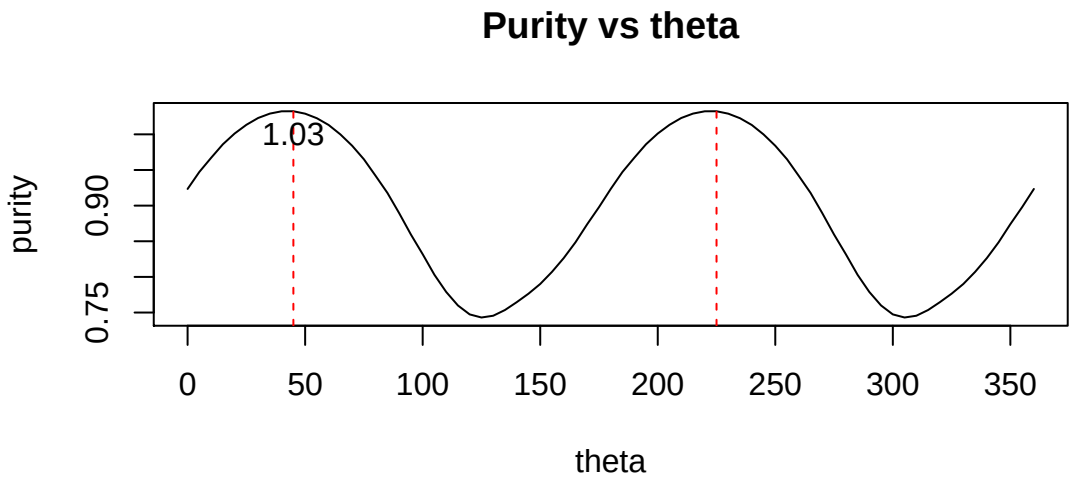
The plot with purity calculated by $D$




The true purity is

```
##      [,1]
## [1,] 8.51
```

The plot with purity calculated by $D^*$




The true purity is

```
##      [,1]
## [1,] 0.94
```