1. Suppose the underlying process $Y(s)$, $s \in [-1, 1]$ has a known mean 0 and a spherical covariogram with range 0.8

$$C(h) = 1 - 1.5(h/0.8) + 0.5(h/0.8)^3, \text{ if } h < 0.8$$

and equals 0 if $h \geq 0.8$. The following function calculates the spherical covariogram:

```
cov.spher=function(x, theta){
  v=theta[1]
  phi=theta[2]
  x[x>phi]=phi
  1-1/5*(x/phi)+0.5*(x/phi)^3
}
```

We observe the process at 40 locations: $j/20$ for $j = \pm1, \pm2, \cdots, \pm20$ and predict $Y(0)$.

   (a) Calculate the 40 simple kriging coefficients. You may obtain the coefficients using matrix-vector operations or a R package such as geoR or gstat.

   (b) Plot the coefficients against the sampling locations.

   (c) You will find that the prediction is influenced by not only two the two adjacent locations: $\pm1/20$, but also some locations far away such as $\pm17/20$ and $\pm15/20$. Is this desirable?

2. Repeat Problem 1 for the squared spherical covariogram $C(h)^2$. Now, which locations are practically influential to the prediction of Y(0)? Which covariogram, the spherical or the squared spherical, would you prefer?