

# Arthurs CVs

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## I suspect these are aerial survey data

Received from French user 10Mar22 ([https://groups.google.com/g/distance-sampling/c/R3\\_-YDBGwl](https://groups.google.com/g/distance-sampling/c/R3_-YDBGwl)), who wanted to compute variance components by hand, because `ds()` does not provide variance components while `dht2()` does.

His survey was stratified, but I'll ignore for the moment and focus upon two stratum-specific estimates (although a pooled detection function is used).

CV components for the first two strata

```
cv.P <- .2303752
cv.ER <- c(.1385482, .1926328)
cv.ES <- c(.2216488, .4822883)
```

“Observed” values of CVs

```
cv.g <- c(.2088841, .4329133)
cv.i <- c(.1728914, .2367275)
```

“Computed” values of CVs

```
computed.cv.g <- sqrt(cv.P^2 + cv.ER^2)
computed.cv.i <- sqrt(cv.P^2 + cv.ER^2 + cv.ES^2)
```

## Difference between observed and computed

```
ratio.group <- cv.g / computed.cv.g
ratio.ind <- cv.i / computed.cv.i
```

CVs for groups from package and  
computed

	<b>output</b>	<b>expect</b>	<b>ratio</b>
Camargue	0.2089	0.2688	0.7770
Gard	0.4329	0.3003	1.4416

CVs for individuals from package and  
computed

	<b>output</b>	<b>expect</b>	<b>ratio</b>
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	<b>output</b>	<b>expect</b>	<b>ratio</b>
Camargue	0.1729	0.3484	0.4962
Gard	0.2367	0.5681	0.4167

## Variance components

Unsurprisingly, when the user tried to compute variance components, disappointing results arose.

```
detfn.comp.indiv <- cv.P^2 / cv.i^2
encreat.comp.indiv <- cv.ER^2 / cv.i^2
size.comp.indiv <- cv.ES^2 / cv.i^2
```

### Variance component proportions

	<b>detfn</b>	<b>encreate</b>	<b>gr.size</b>
Camargue	1.7755	0.6422	1.6436
Gard	0.9471	0.6622	4.1506