Comparación de las medias para varias muestras. Varias variables y varias muestras

Si Λ es pequeña, entonces indica que la variación dentro de las muestras es baja en comparación con la variación total. Esto demuestra que **las muestras no provienen de poblaciones con el mismo vector medio.**

Una prueba aproximada para determinar si la variación dentro de la muestra es significativamente baja en este aspecto se describe en la Tabla 4.4 (texto de Bryan Manly)

Comparación de las medias para varias muestras. Varias variables y varias muestras

Table 4.4 Test Statistics Used To Compare Sample Mean Vectors with Approximate F-Tests for Evidence that the Population Values Are Not Constant

Test	Statistic	F	df_1	df_2	Comment
Wilks's lambda	Λ	$\{(1-\Lambda^{1/t})/\Lambda^{1/t}\}(df_2/df_1)$	$p(m-1)$	$wt-(df_1/2)+1$	$w = n-1-\{(p+m)/2\}$ $t = [(df_1^2-4)/\{p^2+(m-1)^2-5\}]^{1/2}$ If $df_1 = 2$, set $t = 1$
Roy's largest root	λ_1	$(df_2/df_1)\lambda_1$	d	$n-m-d-1$	The significance level obtained is a lower bound $d = \max(p,m-1)$.
Pillai's trace	$V = \sum_{i=1}^{p}\lambda_i/(1+\lambda_i)$	$(n-m-p+s)V/\{d(s-V)\}$	sd	$s(n-m-p+s)$	$s = \min(p,m-1)$ = number of positive eigenvalues $d = \max(p,m-1)$.
Lawes–Hotelling trace	$U = \sum_{i=1}^{p}\lambda_i$	$df_2\,U/(s\,df_1)$	$s(2A+s+1)$	$2(sB+1)$	s is as for Pillai's trace $A = (\lvert m-p-1\rvert -1)/2$ $B = (n-m-p-1)/2$

Note: It is assumed that there are p variables in m samples, with the jth of size n_j, and a total sample size of $n = \Sigma n_j$. These are approximations for general p and m. Exact or better approximations are available for some special cases, and other approximations are also available. In all cases, the test statistic is transformed to the stated F-value, and this is tested to see whether it is significantly large in comparison with the F-distribution with df_1 and df_2 degrees of freedom. Chi-squared distribution approximations are also in common use, and tables of critical values are available (Kres, 1983).

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