

CLASIFICACIÓN DE CUADRICAS

Sea

$$a_{11}x^2 + 2a_{12}xy + 2a_{13}xz + a_{22}y^2 + 2a_{23}yz + a_{33}z^2 + 2a_1x + 2a_2y + 2a_3z$$

Llamemos

$$s_1 = a_{11} + a_{22} + a_{33} \quad s_2 = \begin{vmatrix} a_{11} & a_{12} \\ a_{12} & a_{22} \end{vmatrix} + \begin{vmatrix} a_{11} & a_{13} \\ a_{13} & a_{33} \end{vmatrix} + \begin{vmatrix} a_{22} & a_{23} \\ a_{23} & a_{33} \end{vmatrix}$$

$$\delta_1 = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{12} & a_{22} & a_{23} \\ a_{13} & a_{23} & a_{33} \end{vmatrix} \quad \Delta = \begin{vmatrix} a_{11} & a_{12} & a_{13} & a_1 \\ a_{12} & a_{22} & a_{23} & a_2 \\ a_{13} & a_{23} & a_{33} & a_3 \\ a_1 & a_2 & a_3 & a \end{vmatrix}$$

Si $\delta_1 = 0$ utilizaremos

$$\delta_2 = \begin{vmatrix} a_{11} & a_{12} & a_1 \\ a_{12} & a_{22} & a_2 \\ a_1 & a_2 & a \end{vmatrix} + \begin{vmatrix} a_{11} & a_{13} & a_1 \\ a_{13} & a_{33} & a_3 \\ a_1 & a_3 & a \end{vmatrix} + \begin{vmatrix} a_{22} & a_{23} & a_2 \\ a_{23} & a_{33} & a_3 \\ a_2 & a_3 & a \end{vmatrix}$$

y $\lambda_1, \lambda_2, \lambda_3$ son los autovalores de la matriz de la forma cuadrática.

$\delta_1 \neq 0$ cuádricas con centro	$\Delta/\delta_1 < 0$	$\lambda_1, \lambda_2, \lambda_3 > 0$ elipsoide	
		$\lambda_1, \lambda_2 > 0, \lambda_3 < 0$ hiperboloide	
		$\lambda_1 > 0, \lambda_2, \lambda_3 < 0$ hiperboloide	
		$\lambda_1, \lambda_2, \lambda_3 < 0$ va	
	$\Delta = 0$	$\lambda_1 \cdot \lambda_2, \lambda_1 \cdot \lambda_3 > 0$ un p	
$\delta_1 = 0$ cuádricas sin centro	$s_2 \neq 0$	$\Delta \neq 0$	
		$s_2 > 0$	paraboloi
		$s_2 < 0$	paraboloid
		$\delta_2 \neq 0$	$s_2 > 0$ $\delta_2 \cdot s_1 < 0$
			$\delta_2 \cdot s_1 > 0$
		$\delta_2 = 0$	$s_2 < 0$ cilindro h
			$s_2 > 0$ re
		$s_2 < 0$ dos plane	
	$s_2 = 0$ ($\Delta = 0$)	$\delta_2 \neq 0$ cilindro p	
		$\delta_2 = 0$ planos paralel	