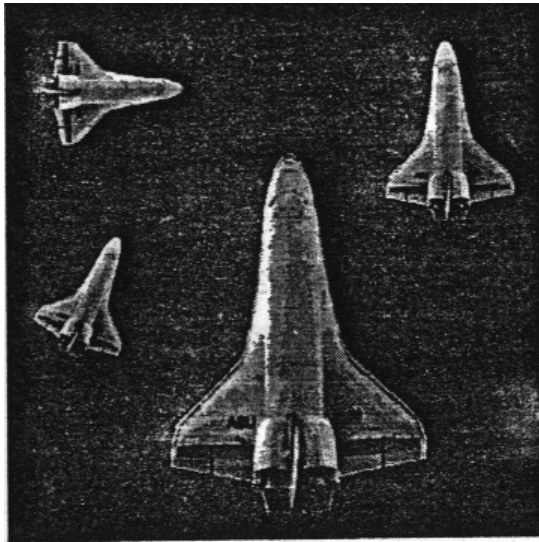


# РАСПОЗНАВАНИЕ ОБРАЗОВ НА ОСНОВЕ ВЫЧИСЛЕНИЯ ИНВАРИАНТНЫХ МОМЕНТОВ ИЗОБРАЖЕНИЙ

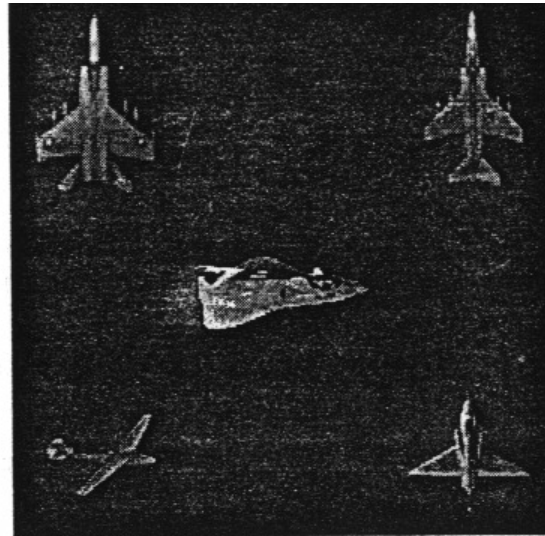
**“Calculus descriptor” (S.Chang and H.Arsenault, 1994):**

$$CD = \iint_{\Omega} \Delta t(x, y) \cdot t(x, y) dx dy$$

**Пример использования: анализ изображений летательных аппаратов:**

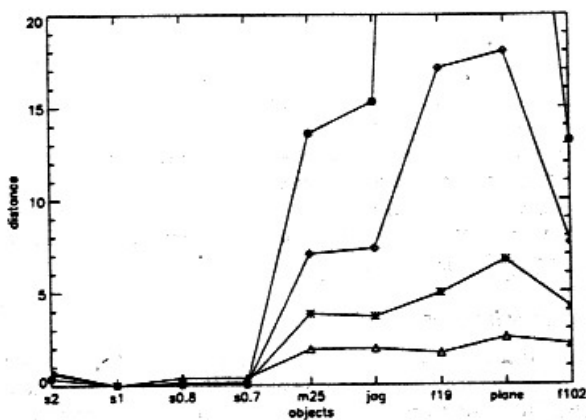


**Fig. 2** Four space shuttles with different sizes and orientations. The largest space shuttle, named s2 (scale factor=2) in Table 1, has size 512×512 pixels; the top right one, s1 (scale factor=1) in Table 1, is the reference with size 256×256; the other two are s0.8 (scale factor=0.8), size 204×204, and s0.7 (scale factor=0.7), size 179×179.



**Fig. 3** Five aircraft, all 128×128. From left to right, top to bottom, they are m25, jag, f19, plane, f102.

объект	s2	s1	s0.8	s0.7	m25	jag	f19	plane	f102
CD	1.00	0.84	0.76	0.76	0.44	0.43	1.2	0.3	0.39



**Fig. 5** The histogram of recognition results on nine aircraft, where ● denotes the result based on a four-component vector, ◊ denotes the result based on a three-component vector, \* denotes the result based on a two-component vector, and △ denotes the result based on a one-component vector, i.e., a single CD value.

**Улучшение дискриминации при  
увеличении количества компонент  
CD-вектора.**

$$CD_i = \iint_{\Omega} \Delta F_i[t(x, y)] \cdot G_i[t(x, y)] dx dy$$