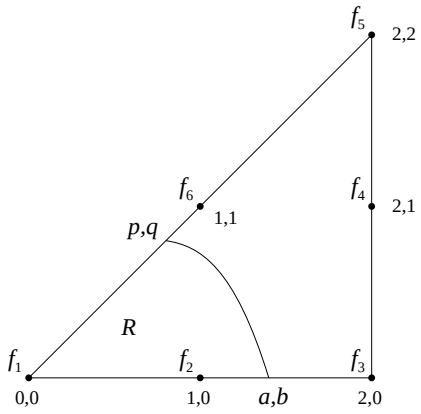
1 SUMMARY

Calculates the **area of a region** R **bounded by a contour** $f(x,y)=f(a,b)$ and the **side(s) of a triangle.** The triangle is assumed to have vertices (0,0), (2,0), (2,2) and the user must provide values of the function f_i, i=1,2,...,6 at the vertices and mid-points of the sides of the triangle. A point (a,b) where the contour cuts the triangle must be specified. The value of the enclosed area is returned as is also the co-ordinates of the other end-point (p,q) of the contour line.



The function $f(x,y)$ is approximated over the triangle by a quadratic form defined using the six given function values.

ATTRIBUTES — Version: 1.0.0. **Types:** GA02A; GA02AD. **Original date:** August 1964. **Origin:** D.Miller, Harwell.

2 HOW TO USE THE PACKAGE

2.1 The argument list

The single precision version

```
CALL GA02A(F,A,B,P,Q,R)
```

The double precision version

```
CALL GA02AD(F,A,B,P,Q,R)
```

F is a REAL (DOUBLE PRECISION in the D version) array of length six which must be set by the user to the six function values $f(0,0)$, $f(1,0)$, $f(2,0)$, $f(2,1)$, $f(2,2)$ and $f(1,1)$ respectively. **Restriction:** the subroutine may fail if the function $f(x,y)$ is linear in either x or y.

A,B are REAL (DOUBLE PRECISION in the D version) variables which must be set by the user to the point where the contour intersects with a side of the triangle. **Restriction:** the subroutine may fail if (a,b) is a vertex of the triangle.

P,Q are REAL (DOUBLE PRECISION in the D version) variables which are set by the subroutine to the other end-point where the contour intersects with a side of the triangle.

R is a REAL (DOUBLE PRECISION in the D version) variable which is set by the subroutine to the area of the region

R enclosed by the contour and the sides of the triangle. The area that is calculated is the one that contains the point (0,0).

2.2 Printed output

Printing only occurs when there are errors. If the point (a, b) does not lie on the boundary of the triangle the message

```
ERROR IN INPUT
```

is printed. Other possible messages are:

```
P NOT IN RANGE
```

and

```
Q NOT IN RANGE
```

when the subroutine is not functioning as expected.

3 GENERAL INFORMATION

Use of common: None.

Workspace: None.

Other routines called directly: GA02A/AD.

Input/output: Error diagnostics, see §2.2.

Restrictions: Problems may occur when (a, b) is a vertex of the triangle and also if the function $f(x, y)$ is linear in either x or y.

4 METHOD

The function $f(x, y)$ is approximated over the triangle by a quadratic form defined using the six given function values.