**Thuật toán MidPoint vẽ đoạn thẳng**

**TH1 : 0<= m <= 1**

B1 : S(xi+1; yi) P(xi+1; yi+1)

B2 : Midpoint(xi+1 ; yi+1/2)

B3 : Xét dấu pi: pi<0 chọn S, pi >= 0 chọn P

B4 : xác định công thức truy hồi cho pi dựa vào hiệu (pi+1) – pi

= 2[A(xi+1+1)+B(yi+1+1/2)] - 2[A(xi+1)+B(yi+1/2)]

= 2 A(xi+1+1) -2A(xi+1)+2B(yi+1+1/2) -2B(yi+1/2)

2A + 2B(yi+1-yi) = 2Dy-2Dx(yi+1-yi)

* pi+1 = pi + 2Dy-2Dx(yi+1-yi)

Nếu pi < 0 => chọn S => pi += ***2Dy***

Nếu pi >=0 => chọn p => ***2Dy-2Dx***

B5 : Tính p1

p1 = 2F(x1+1, y1+1/2) = 2(A(x1+1)) + 2B(y1+1/2) + 2C

= 2(Ax1 + By1 + 2C) + 2A+ B = ***2Dy – Dx***

**TH 2 : m > 1**

B1 : S(xi, yi +1), P(xi +1, yi+1)

B2 : Midpoint = (xi+1/2; yi+1)

B3 : pi < 0 Chọn S, pi >= 0 Chọn P

B4 : (pi+1) – pi =

2[A(xi+1+1/2)+B(yi+1+1) + C] - 2[A(xi+1/2)+B(yi+1) + C]

= 2B + 2A(xi+1 – xi)

= -2Dx +2Dy(xi+1 – xi)

Nếu pi < 0 => chọn S => pi += -2Dx

Nếu pi >=0 => chọn P => pi=> -2Dx+2Dy

B5 :

p1 = 2F(x1+1/2, y1+1) = 2(A(x1+1/2)) + 2B(y1+1) + 2C

= 2(Ax1 + By1 +C) + A + 2B = Dy – 2Dx

**TH3 : 0 <= m <= -1**

B1 : S(xi + 1 , yi) P(xi + 1; yi-1)

B2 : Midpoint(xi + 1, yi – 1/2)

B3 : Nếu pi < 0 Chọn P , pi >=0 chọn S

B4 : (pi+1) – pi

= 2[A(xi+1+1)+B(yi+1-1/2) + C] –

2[A(xi+1)+B(yi-1/2) + C]

= 2A - 2B(yi+1 – yi)

Nếu pi < 0 chọn P => pi+1 = ***2(Dx + Dy)***

Nếu pi >= 0 chọn S => ***2Dy***

B5 : p1 = 2F(x1+1, y1-1/2) = 2(A(x1+1)) + 2B(y1-1/2) + 2C

= 2(Ax1 + By1 + C) + 2A - B = ***2Dy + Dx***

**TH 4 : m < -1**

B1 : S(xi, yi-1) P(xi+1; yi-1)

B2 : Midpoint(xi + 1/2, yi - 1)

B3 : Nếu pi < 0 Chọn S, pi >=0 chọn P

B4 : (pi+1) – pi

= 2[A(xi+1+1/2)+B(yi+1-1) + C] –

2[A(xi+1/2)+B(yi-1) + C]

= 2A(xi+1 - Xi ) - 2B

Nếu pi < 0 chọn S => pi+1 = ***2Dx***

Nếu pi >= 0 chọn P => ***2(Dx + Dy)***

B5 : p1 = 2F(x1+1/2, y1-1) = 2(A(x1+1/2)) + 2B(y1-1) + 2C

= 2(Ax1 + By1 + C) + A - 2B = ***2Dx + Dy***