*P*4, *ϕ*4 *u*



# 1 − *u*

*P*3, *ϕ*3

1. Find u and v

*Px* = (1 − *u*)*Px*

2

*Px* = (1 − *u*)*Px*

3

*Py* = (1 − *v*)*Py*

4

*Py* = (1 − *v*)*Py*

3

+ *uPx* **or**

1

+ *uPx*

4

*vPy* **or**

+

1

*vPy*

+

2

*u*

*v*

*P* , *ϕ*

# 1 − *u*

*P* , *ϕ*

1. Calculate phi using bilinear interpolation
   1. Interpolate twice horizontally using u to find two points between vertices
   2. Interpolate once vertically between the two new points using v

\*\*You can also compute vertical then horizontal

1 1 2 2

1 − *v*

*P*4 = (0,1), *ϕ*4 = 0.0 *P*3 = (1,1), *ϕ*3 = 0.5

*Pa* = (0.5,0.5), *ϕa* = 0.5

*Pb* = (0.75,0.5), *ϕb* = 0.375

*Pc* = (0.25,0.75), *ϕc* = 0.75

*P*1 = (0,0), *ϕ*1 = 0.5 *P*2 = (1,0), *ϕ*2 = 1.0

*0.40625*

*0.46875*

*0.71875*

*P*4 = (2,4), *ϕ*4 = 0.0 *P*3 = (4,4), *ϕ*3 = 0.5

|  |  |  |
| --- | --- | --- |
| *Pa*  *Pb* | = (3.0,2.5), *ϕa*  = (3.5,3.0), *ϕb* | = ?  = ? |
| *Pc* | = (3.0,3.5), *ϕc* | = ? |

*P*1 = (2,2), *ϕ*1 = 0.75 *P*2 = (4,2), *ϕ*2 = 1.0

*P*4 = (0,1), *ϕ*4 = 0.0 *P*3 = (1,1), *ϕ*3 = 0.5

Draw the marching squares geometry for

*f* −1(0.5)

*f* −1(0.75)

*f* −1(0.25)

Remember: Find crossings and connect them

*P*1 = (0,0), *ϕ*1 = 0.5 *P*2 = (1,0), *ϕ*2 = 1.0

*P*4 = (0,1), *ϕ*4 = 0.0 *P*3 = (1,1), *ϕ*3 = 0.5

Draw the marching squares geometry for

*f* −1(0.75)

*f* −1(0.25)

Remember: Find crossings and connect them

*P*1 = (0,0), *ϕ*1 = 0.5 *P*2 = (1,0), *ϕ*2 = 0.0

       

*f* −1(0.5)



|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 1.0 | 1.0 | 1.0 |  |  |  |
|  | 1.0 | 2.0 | 1.0 | 1.0 |  |  |
|  | 1.0 | 1.0 | 1.0 | 1.0 |  |  |
|  |  | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
|  |  |  |  | 1.0 | 2.0 | 1.0 |
|  |  |  |  | 1.0 | 1.0 | 1.0 |
|  |  |  |  |  |  |  |

*f* −1(0.75)

*f* −1(1.5)



*f* −1(1.5)



1.0

x

1.0

1.0

1.0

1.0

1.0

1.0

1.0

2.0

1.0

1.0

2.0

1.0

1.0

### Draw the ambiguous isocontour.

If I said that the saddle point inside the cell denoted by (X) has value 1.75, is this still ambiguous? If not, what is the correct isocontour?