

# Free-Jet Code Benchmark

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SUNY Stony Brook

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# Five Different Forms Of Velocity Fields

- $u = 1.0, v = 0;$
- $u = 0, v = -1.0;$
- $u = 1.0, v = -1.0;$
- $\Psi = \sin^2[\pi(x + 0.5)]\sin^2[\pi(y + 0.5)] / \pi,$

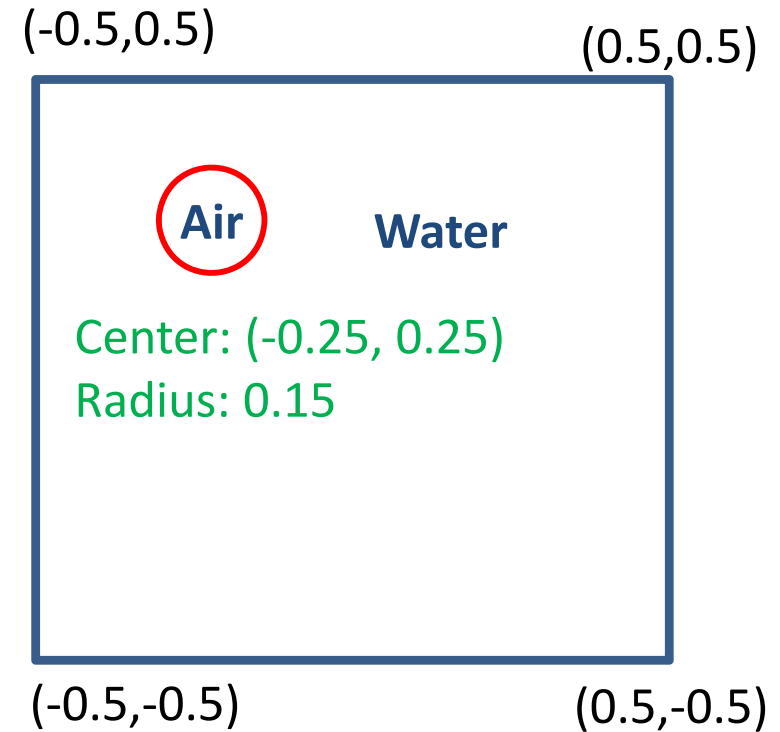
$$\rightarrow u = -\partial \Psi / \partial y = -2\sin^2(\pi X)\sin(\pi Y)\cos(\pi Y)$$

$$v = \partial \Psi / \partial x = 2\sin(\pi X)\cos(\pi X)\sin^2(\pi Y),$$

where  $X = x + 0.5$ , and  $Y = y + 0.5$ ;

- $\Psi = \sin^2[\pi(x + 0.5)]\sin^2[\pi(y + 0.5)]\cos(\pi t / T) / \pi,$

and  $T = 2.0, 6.0$  and  $12.0$ .

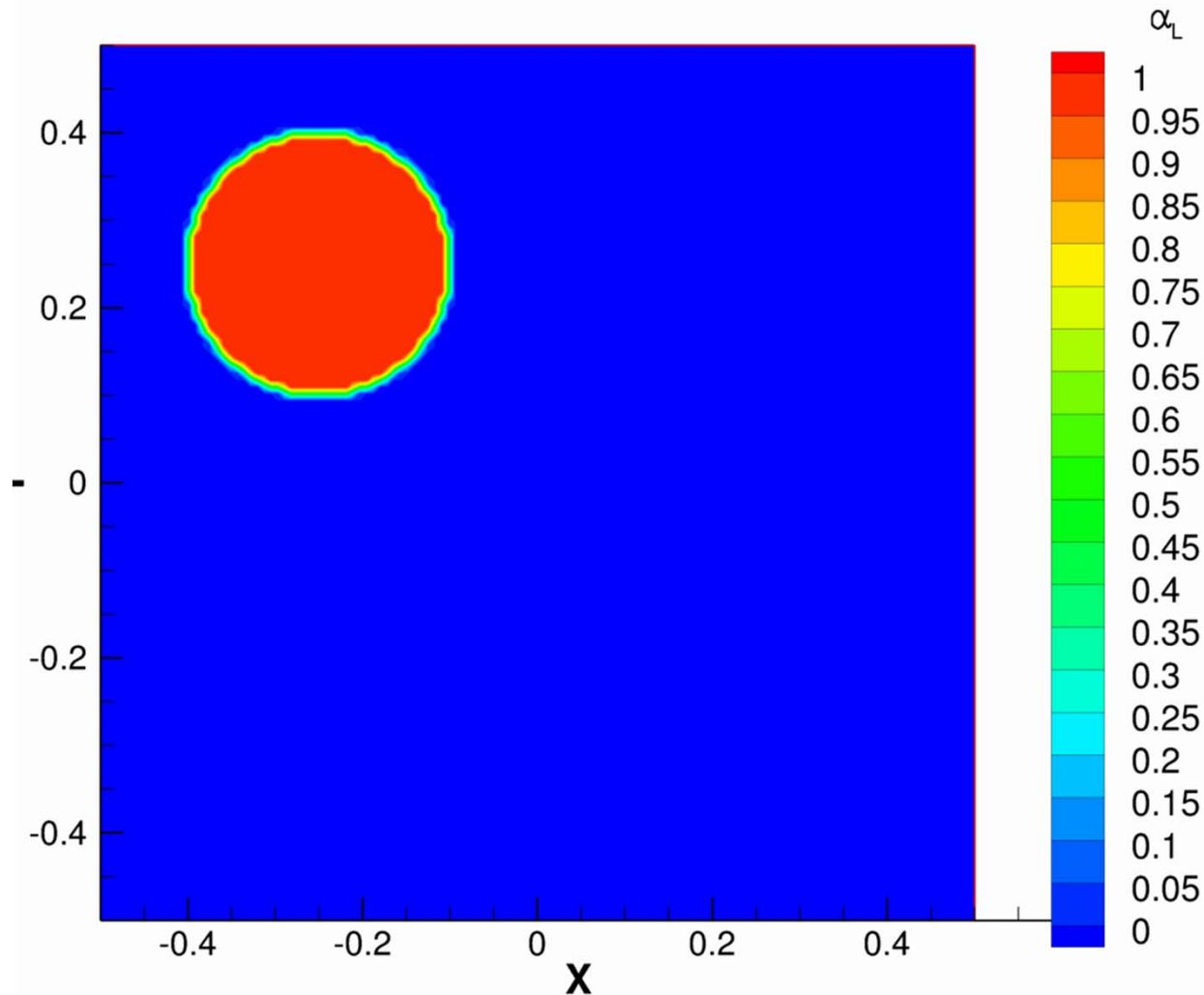


## 3 Methods: VOF, CLSVOF, LS

# Movement of Two-Phase Circle Using Volume-of-Fluid Method (FLUENT)

[Click on image to watch video]

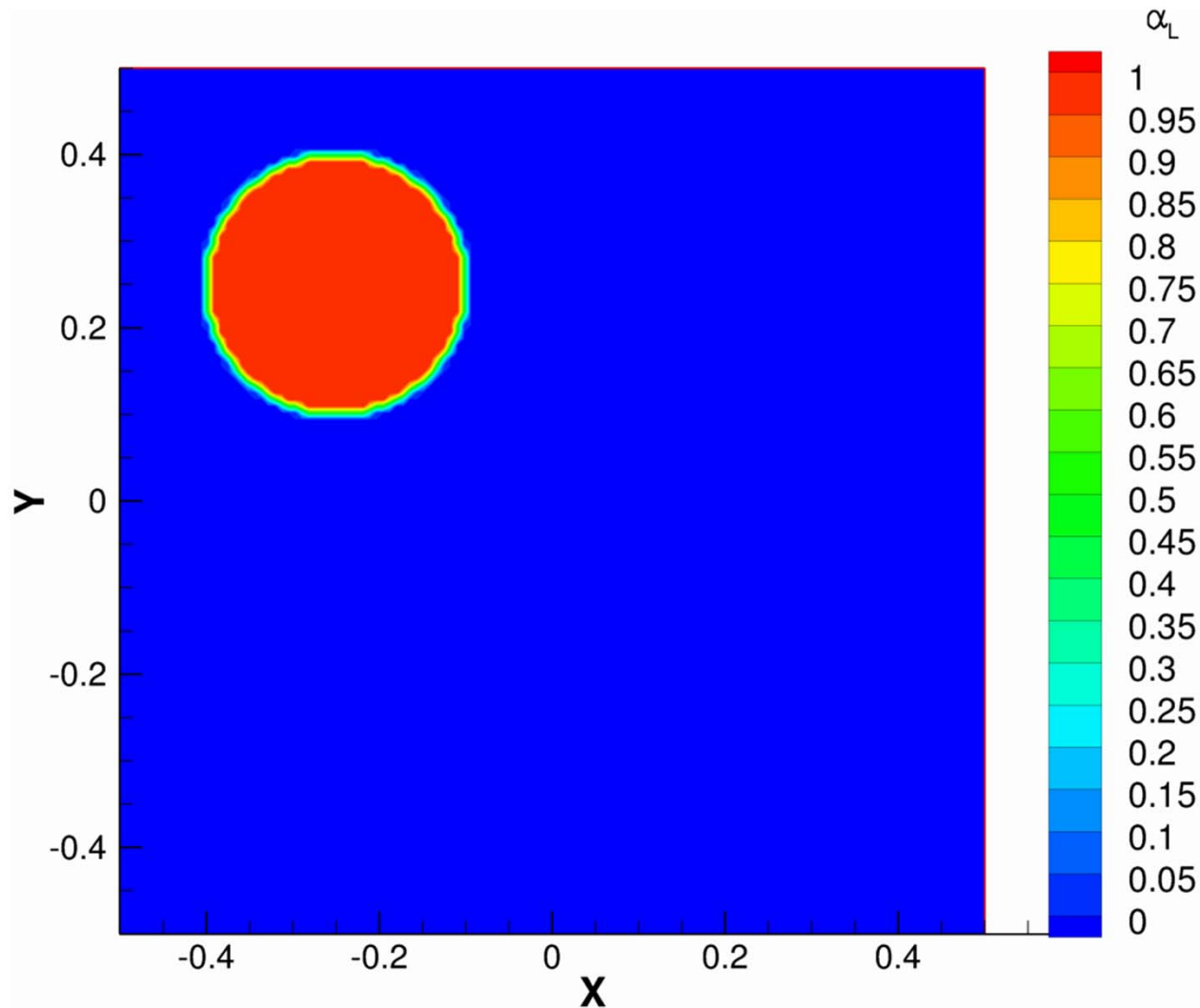
$$u = 1.0$$



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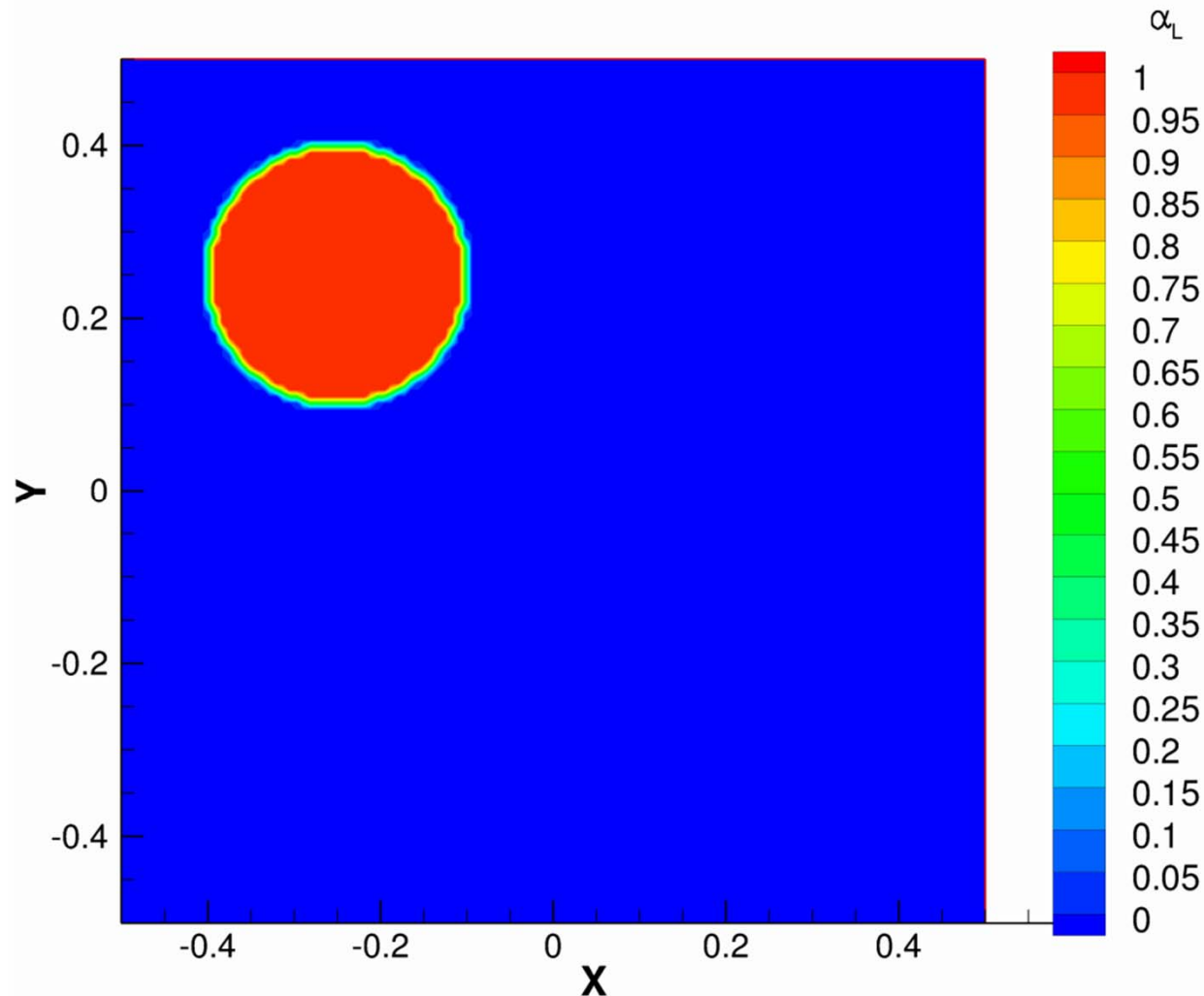
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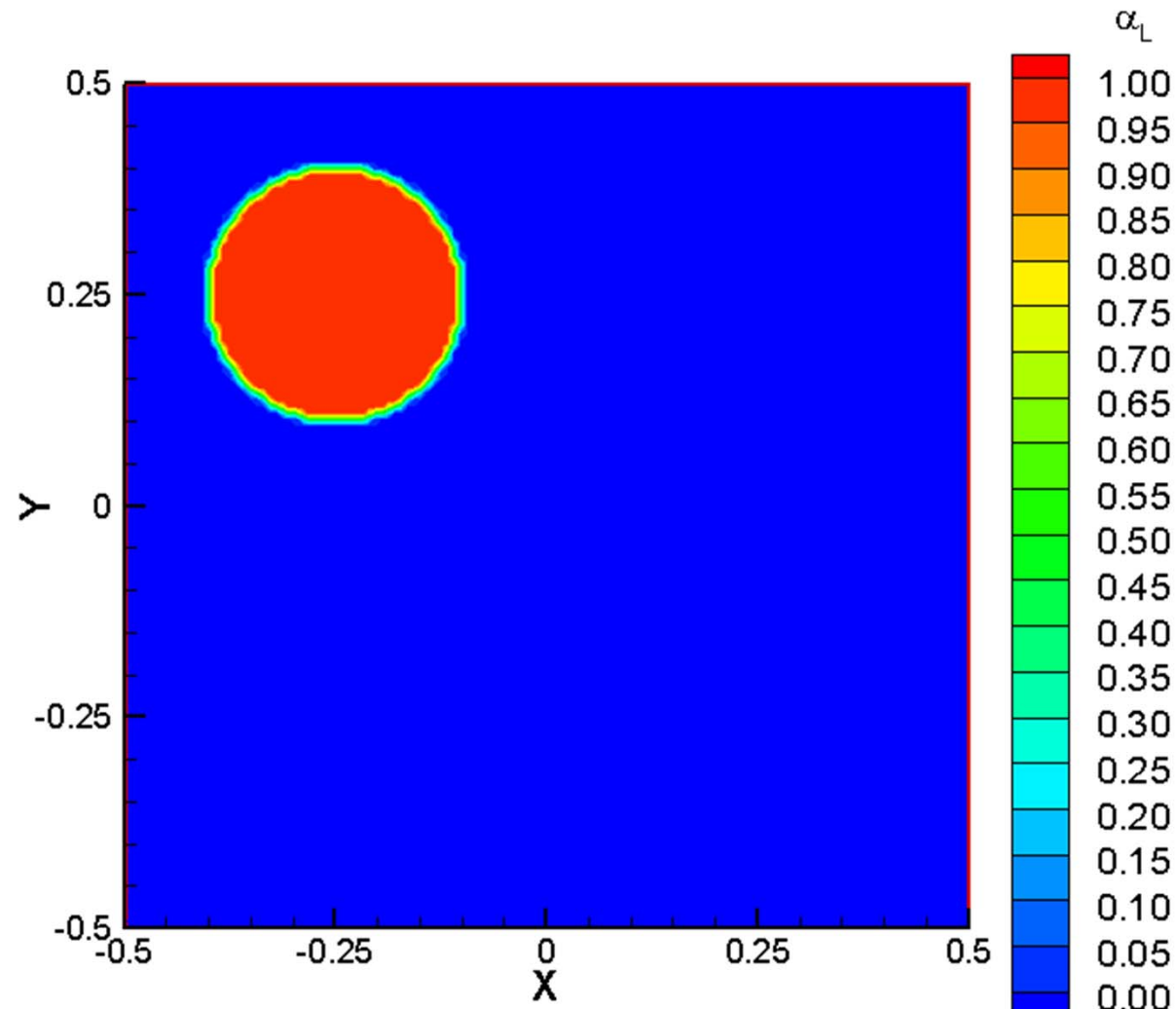
$$u = 1, v = -1$$



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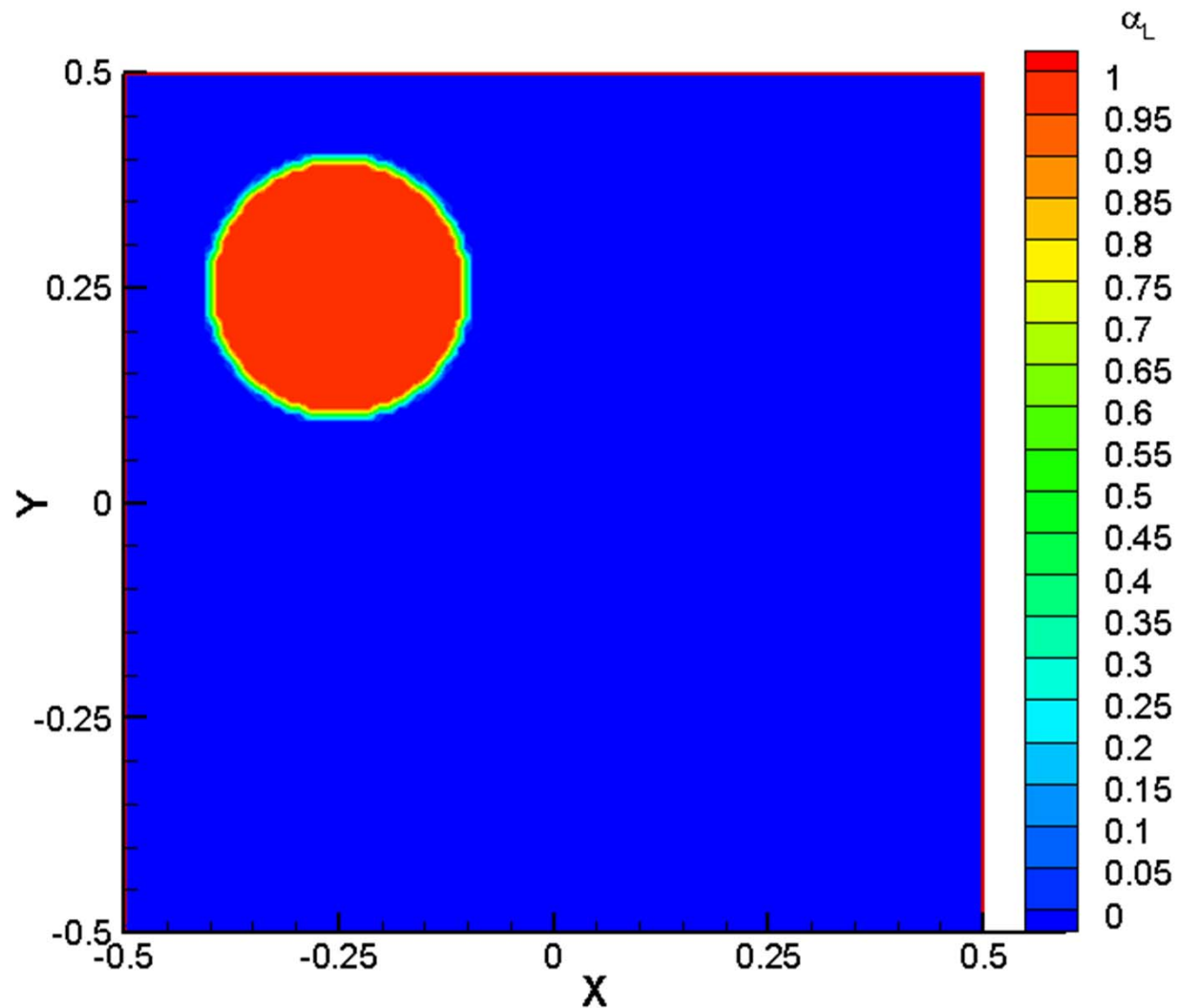
$\Psi = \sin^2(\pi x)\sin^2(\pi y)/\pi$ , where  $\Psi$  = stream function, velocity:  $u = -\partial \Psi/\partial y$ ,  $v = \partial \Psi/\partial x$



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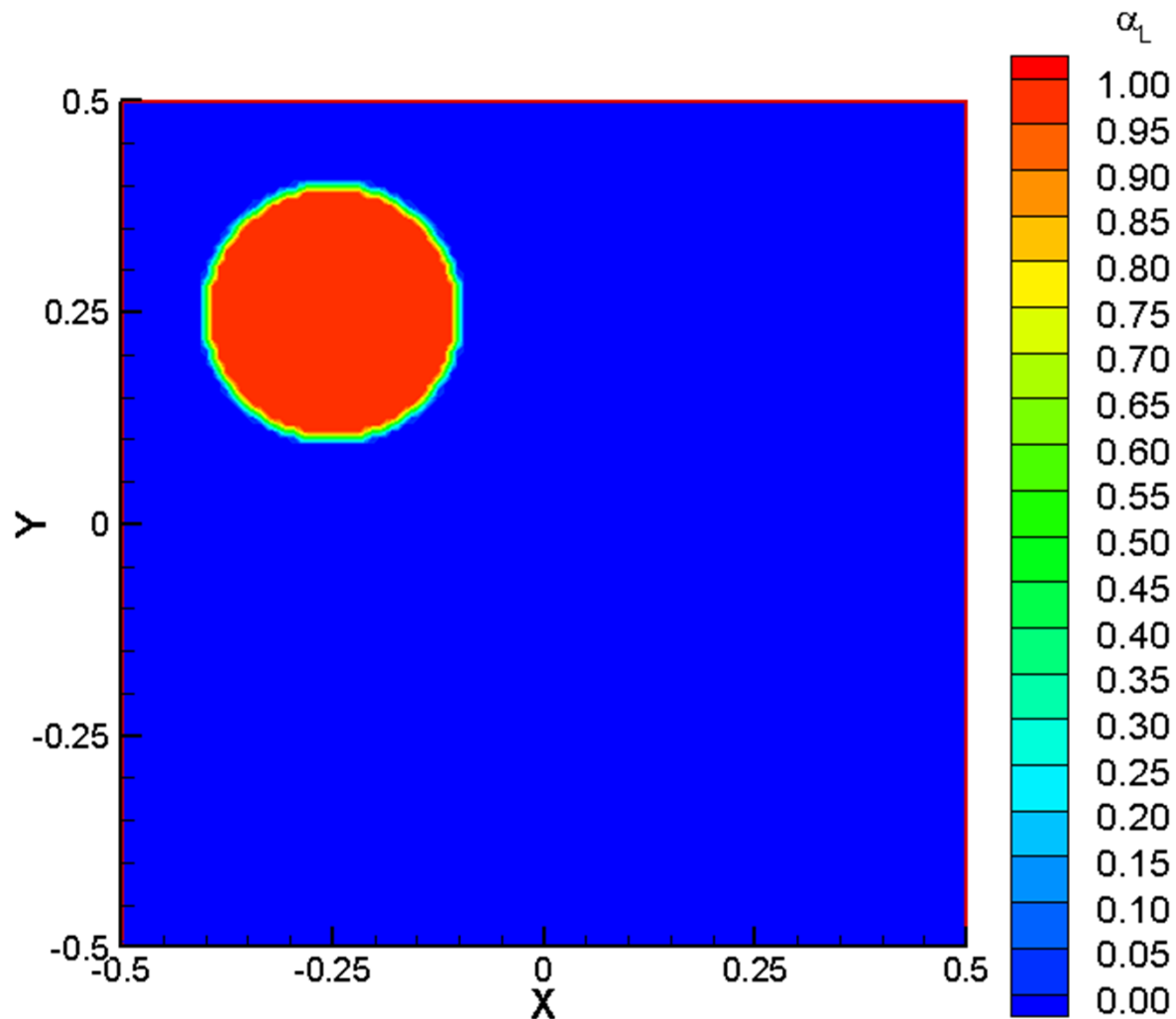
$\Psi = \sin^2(\pi x)\sin^2(\pi y)\cos(\pi t/2.0)/\pi$ , where  $\Psi$  = stream function,  
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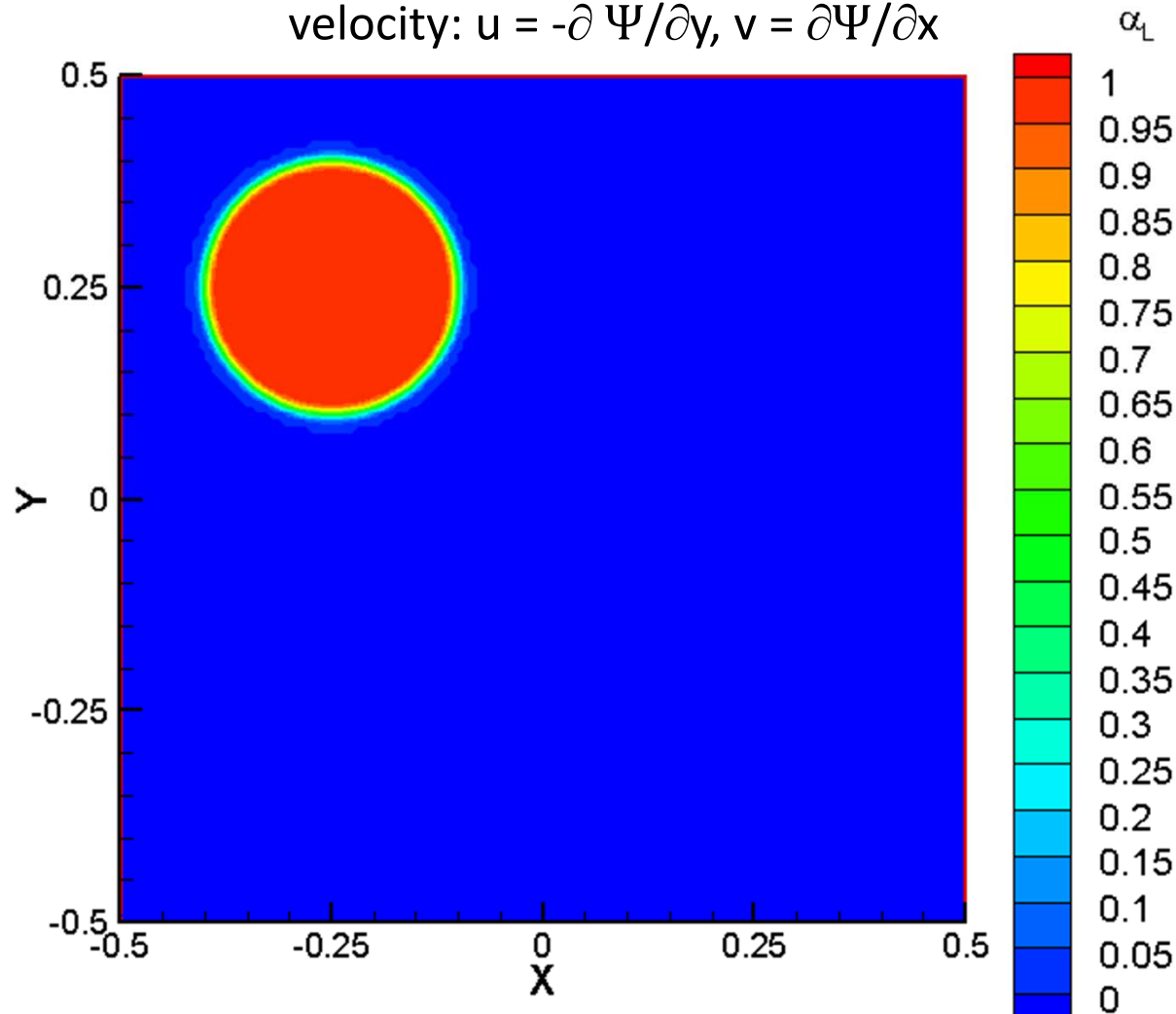




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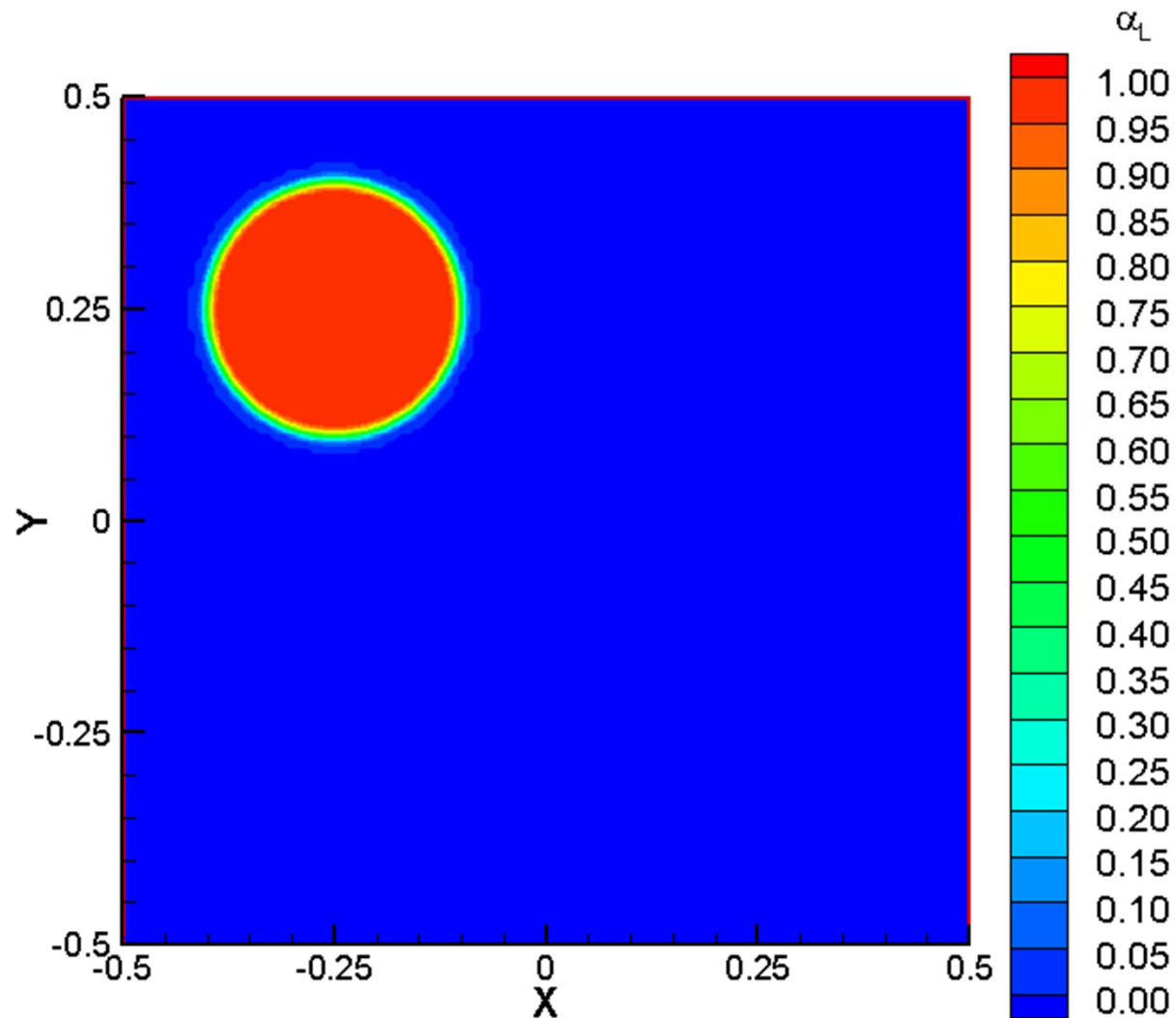
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# Movement of Two-Phase Circle Using CLSVOF Model (FLUENT)

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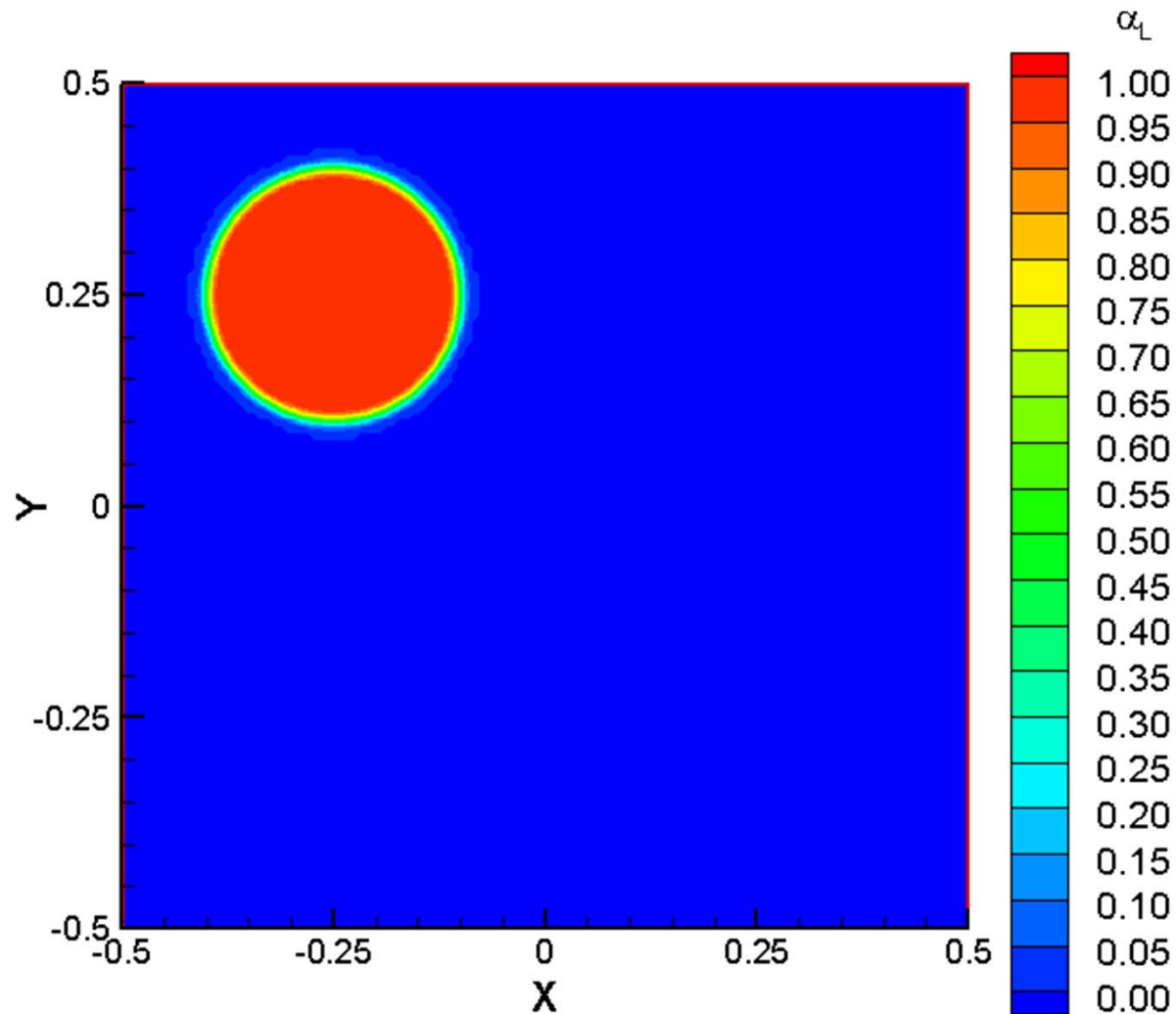
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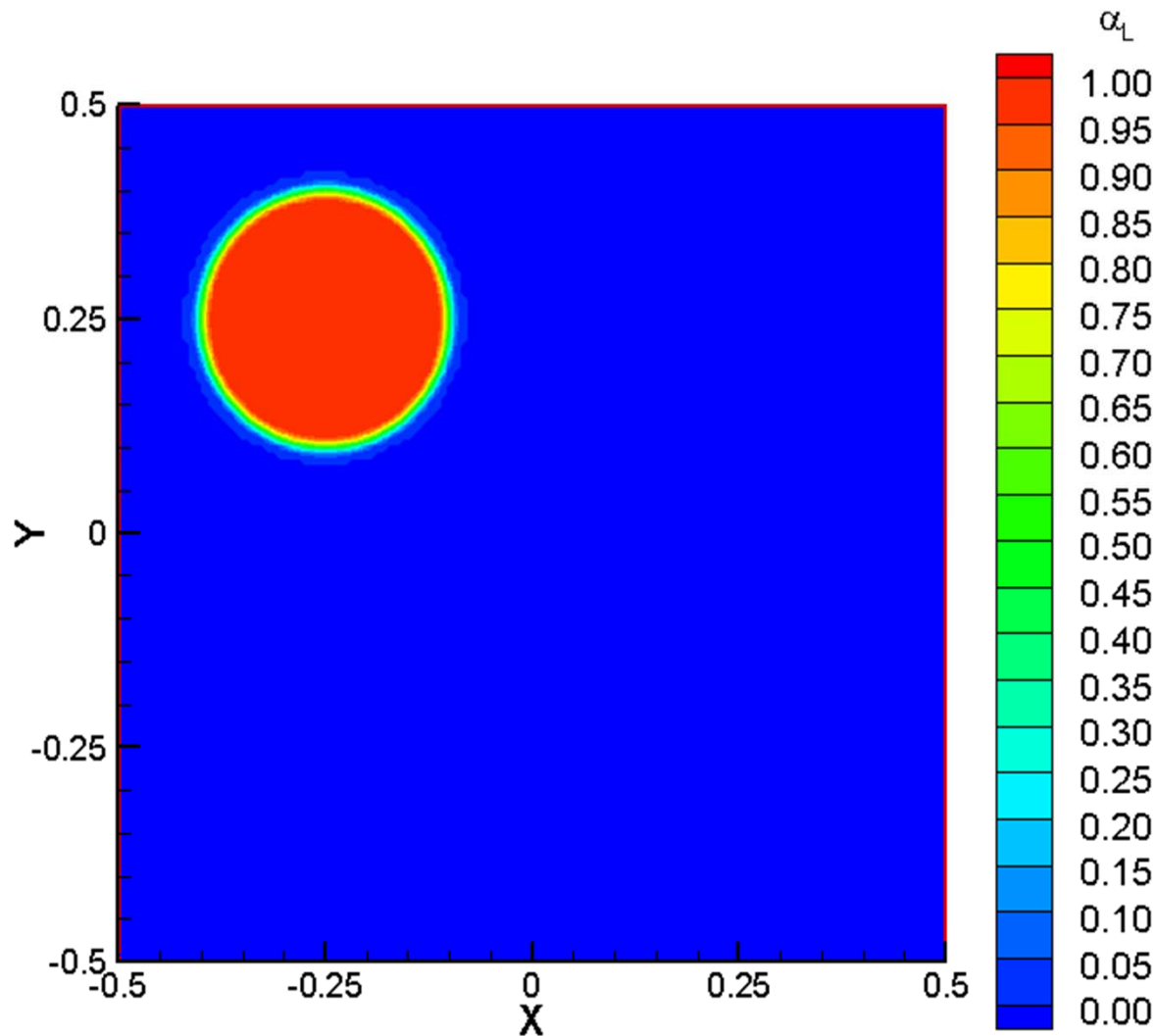
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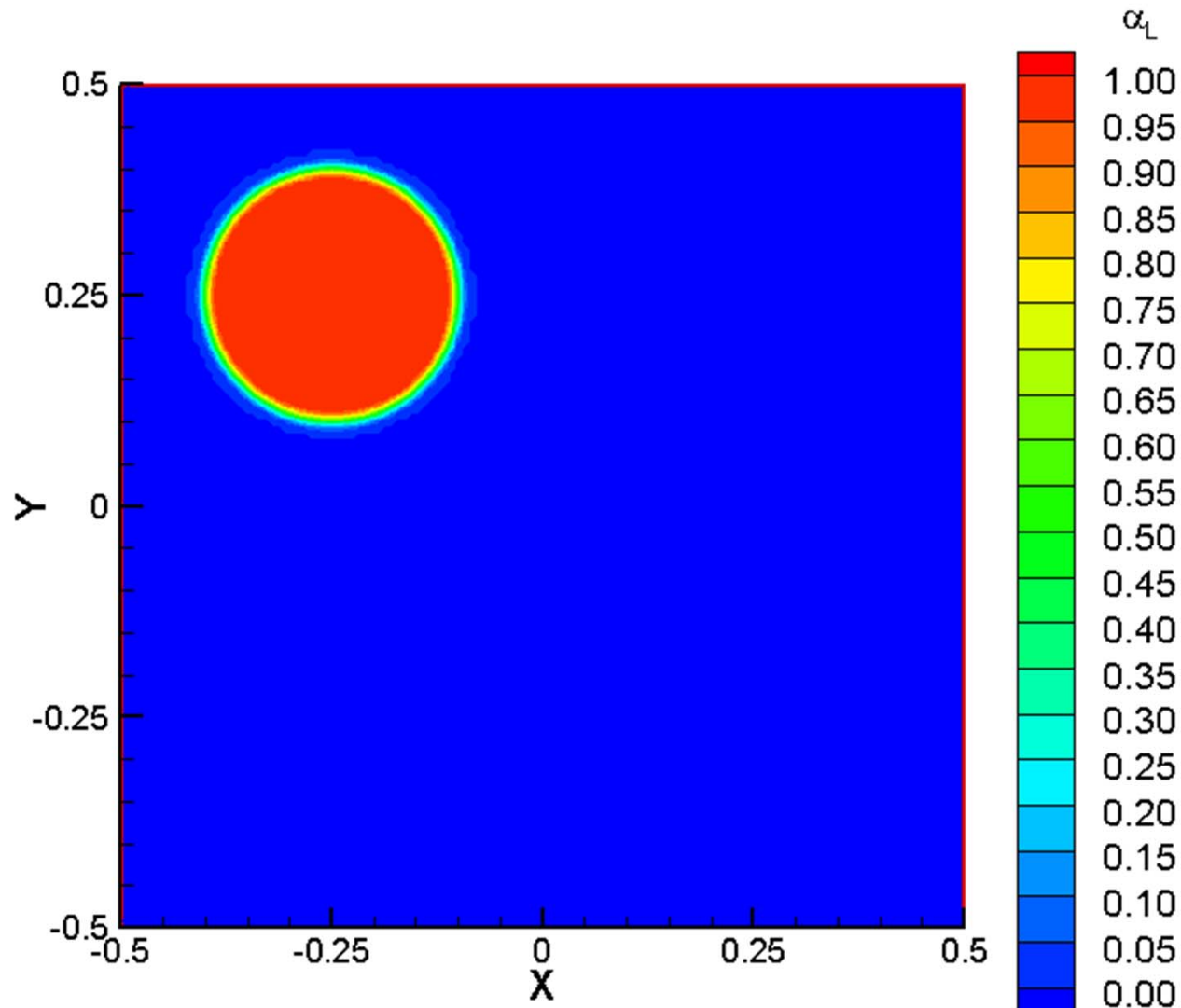
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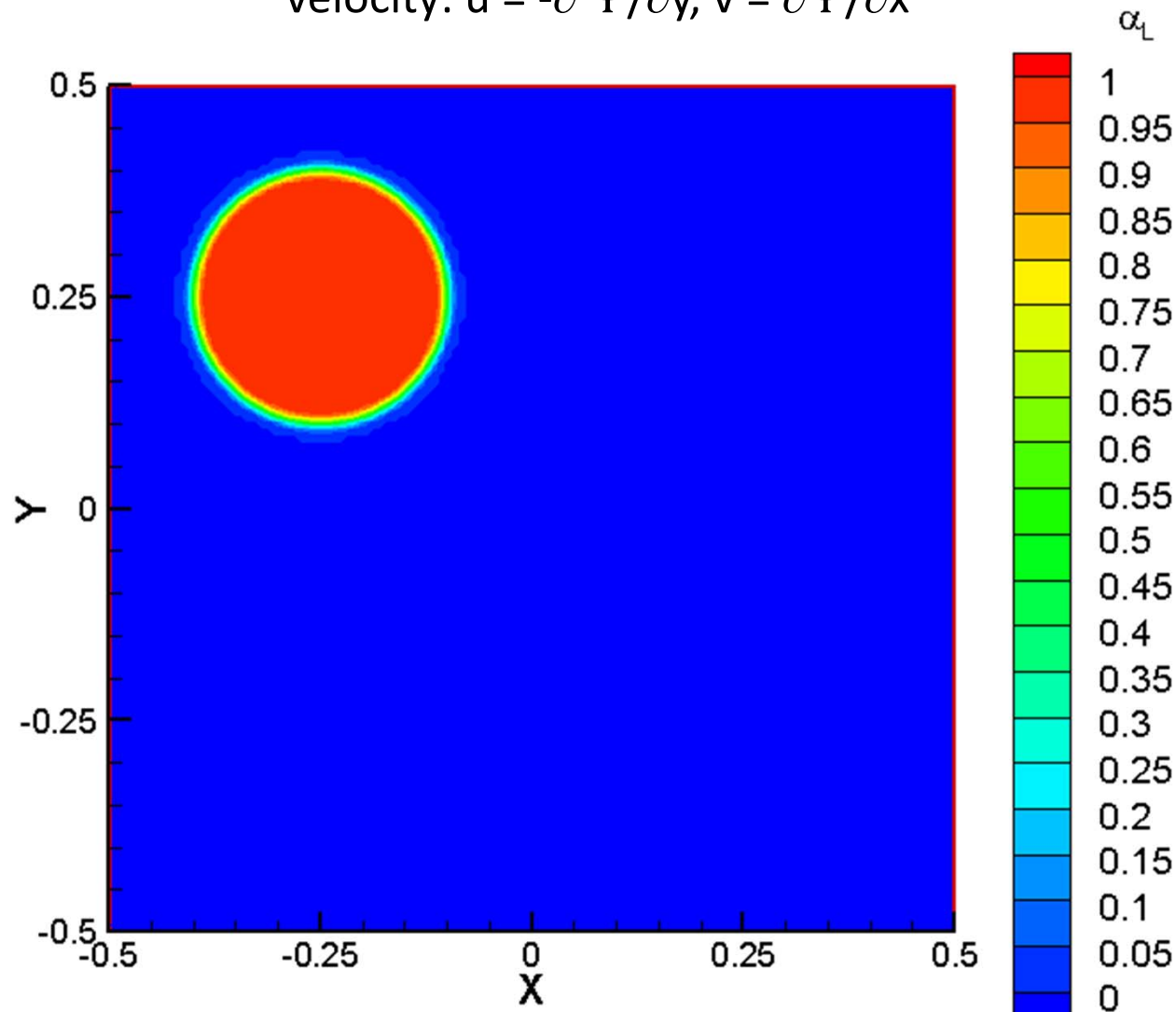
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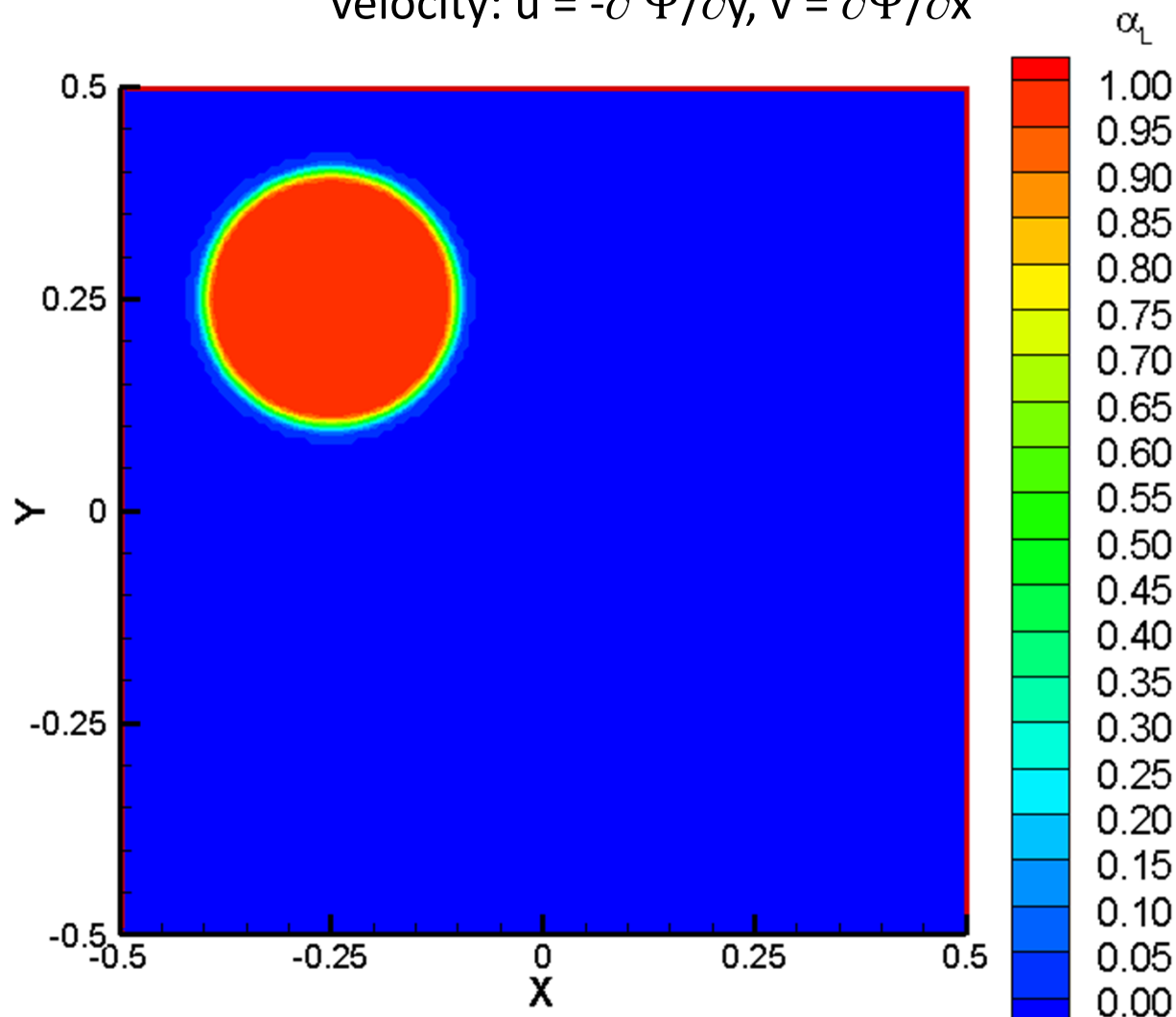
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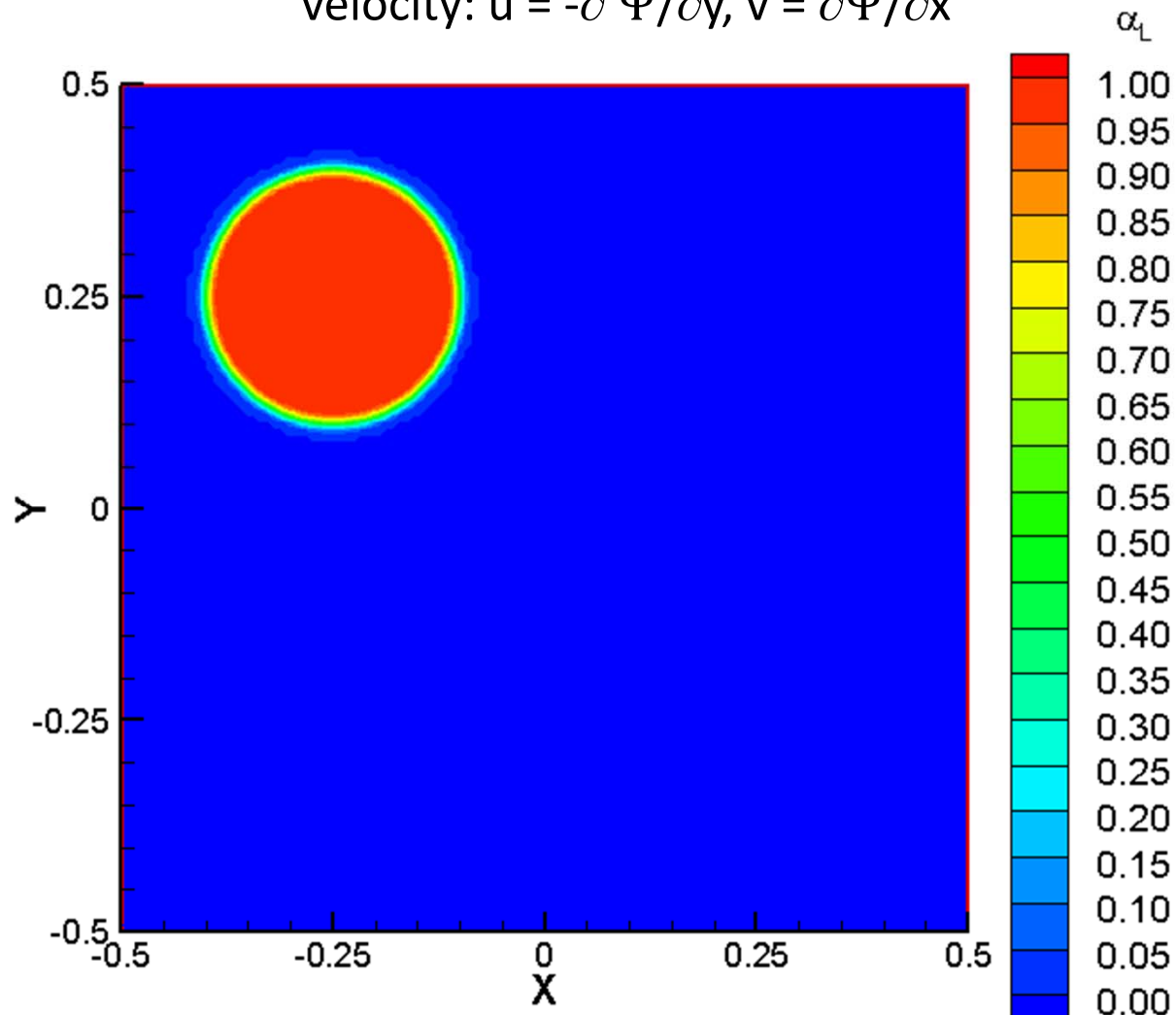
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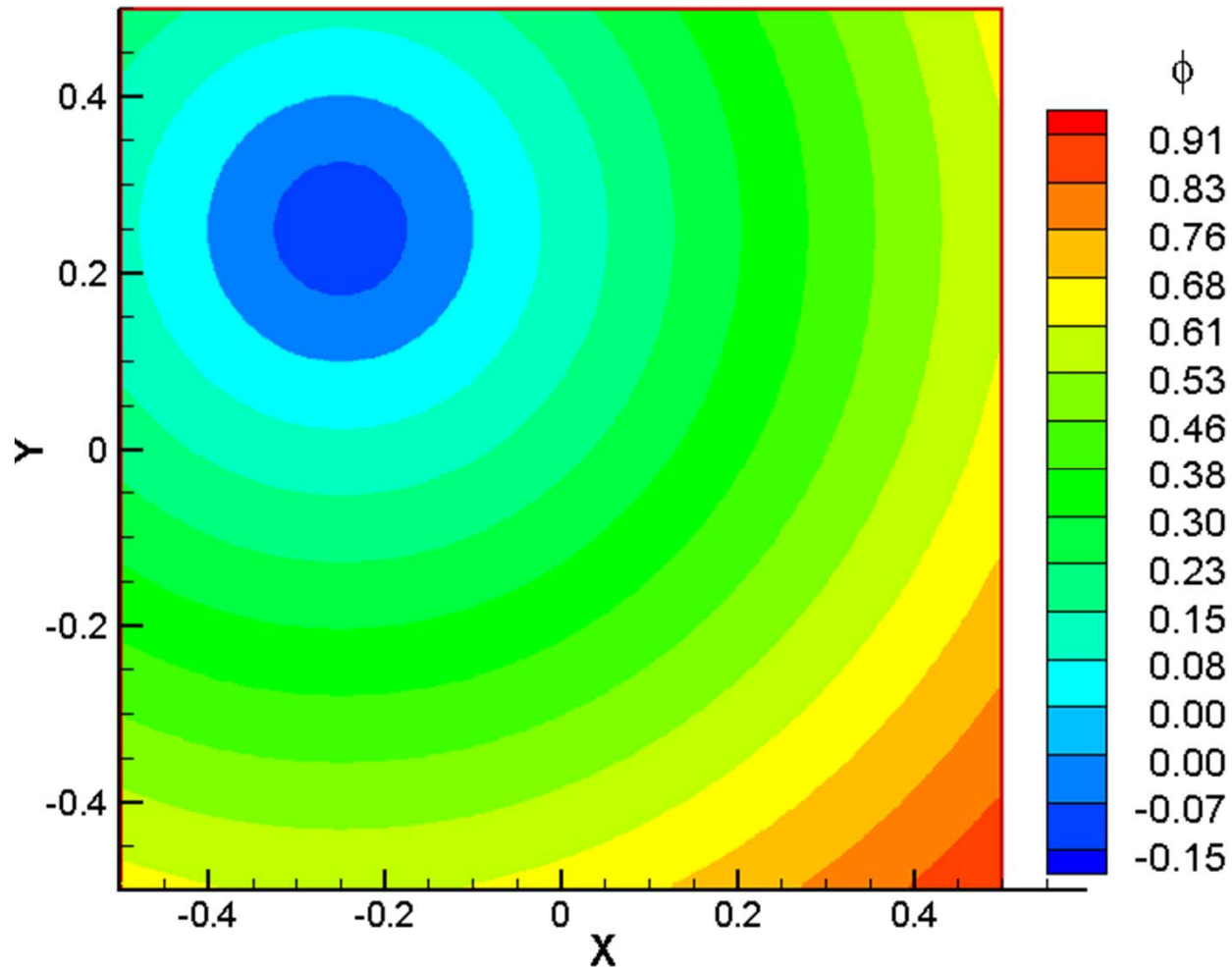




# Movement of Two-Phase Circle Using Level Set Method

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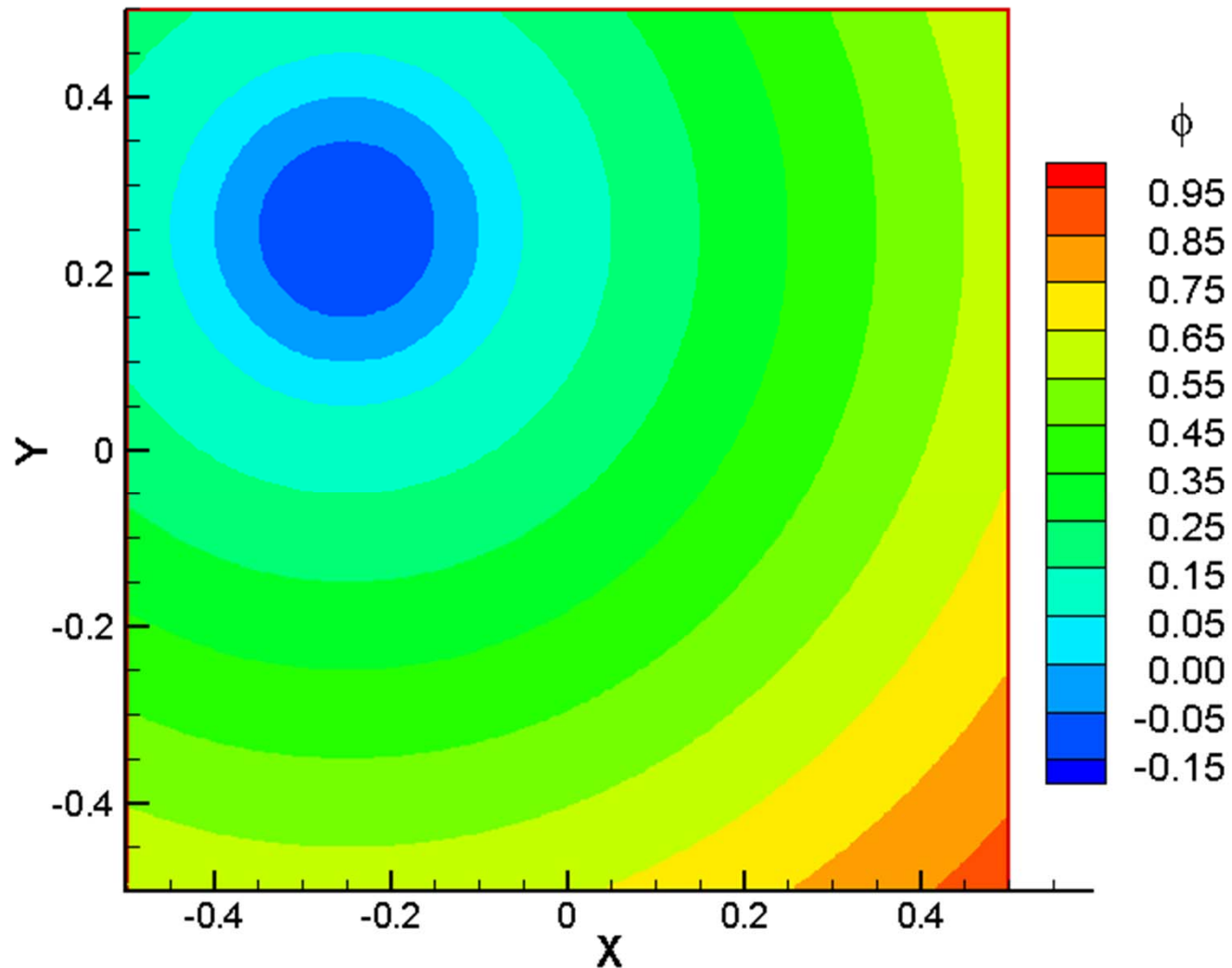
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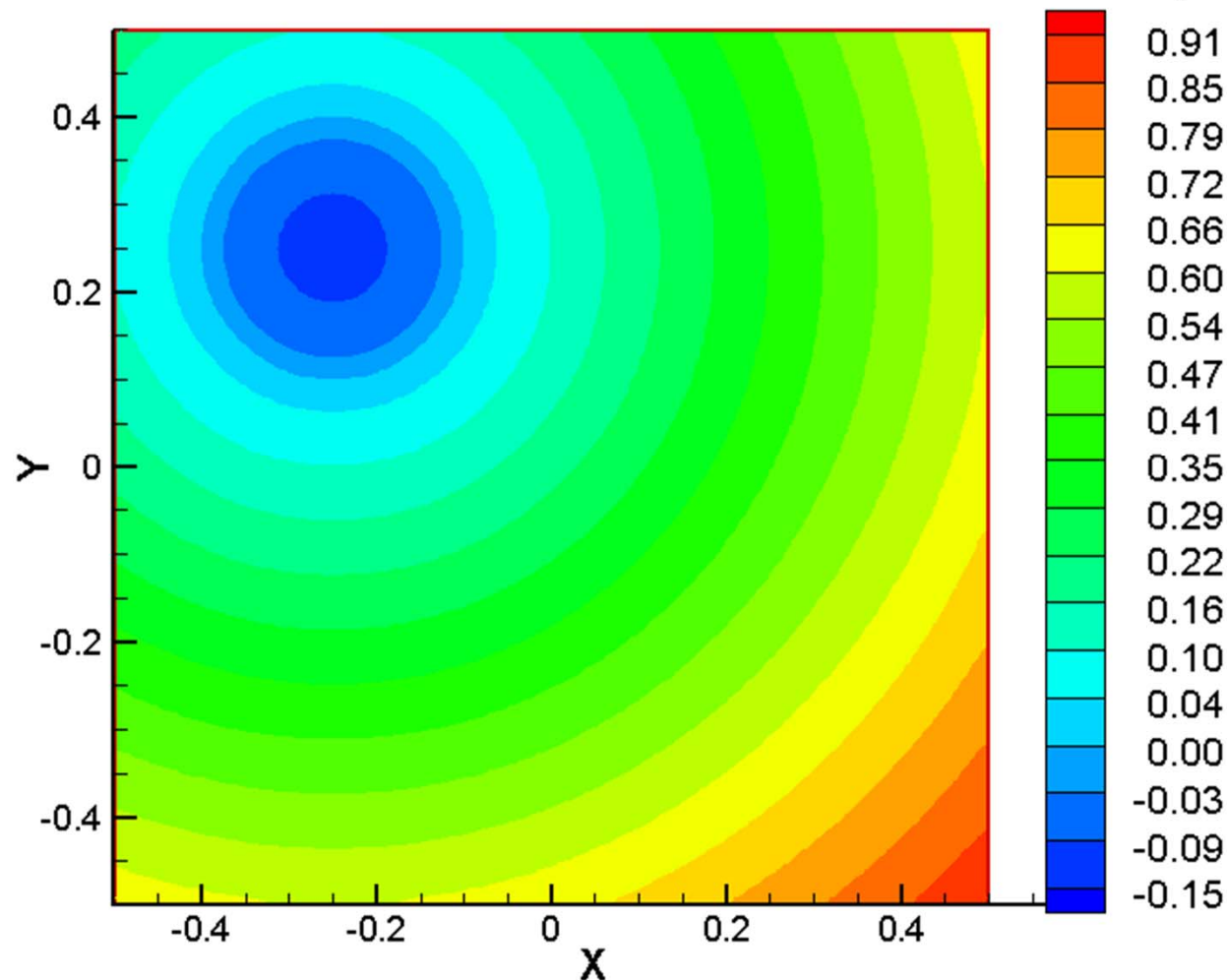
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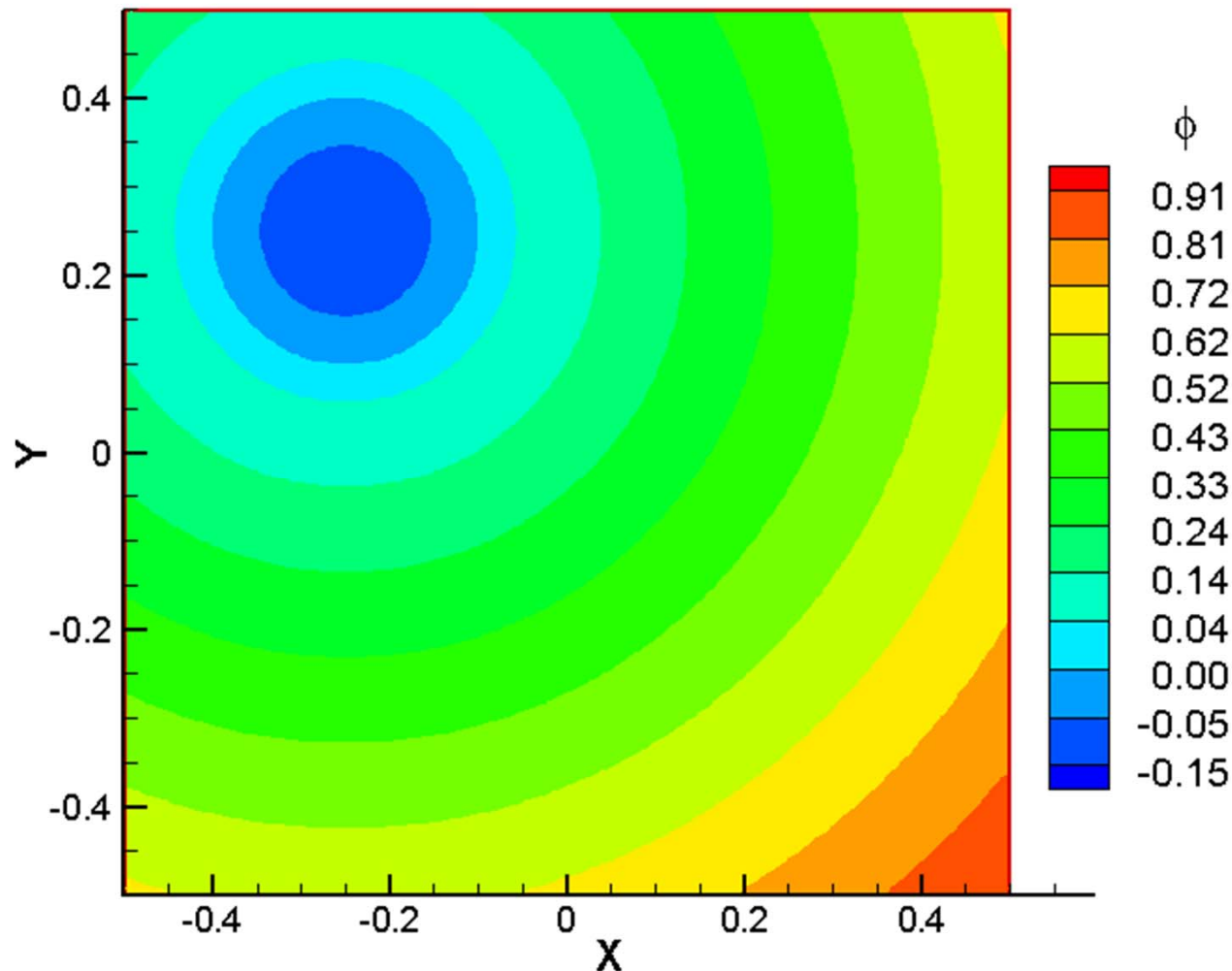
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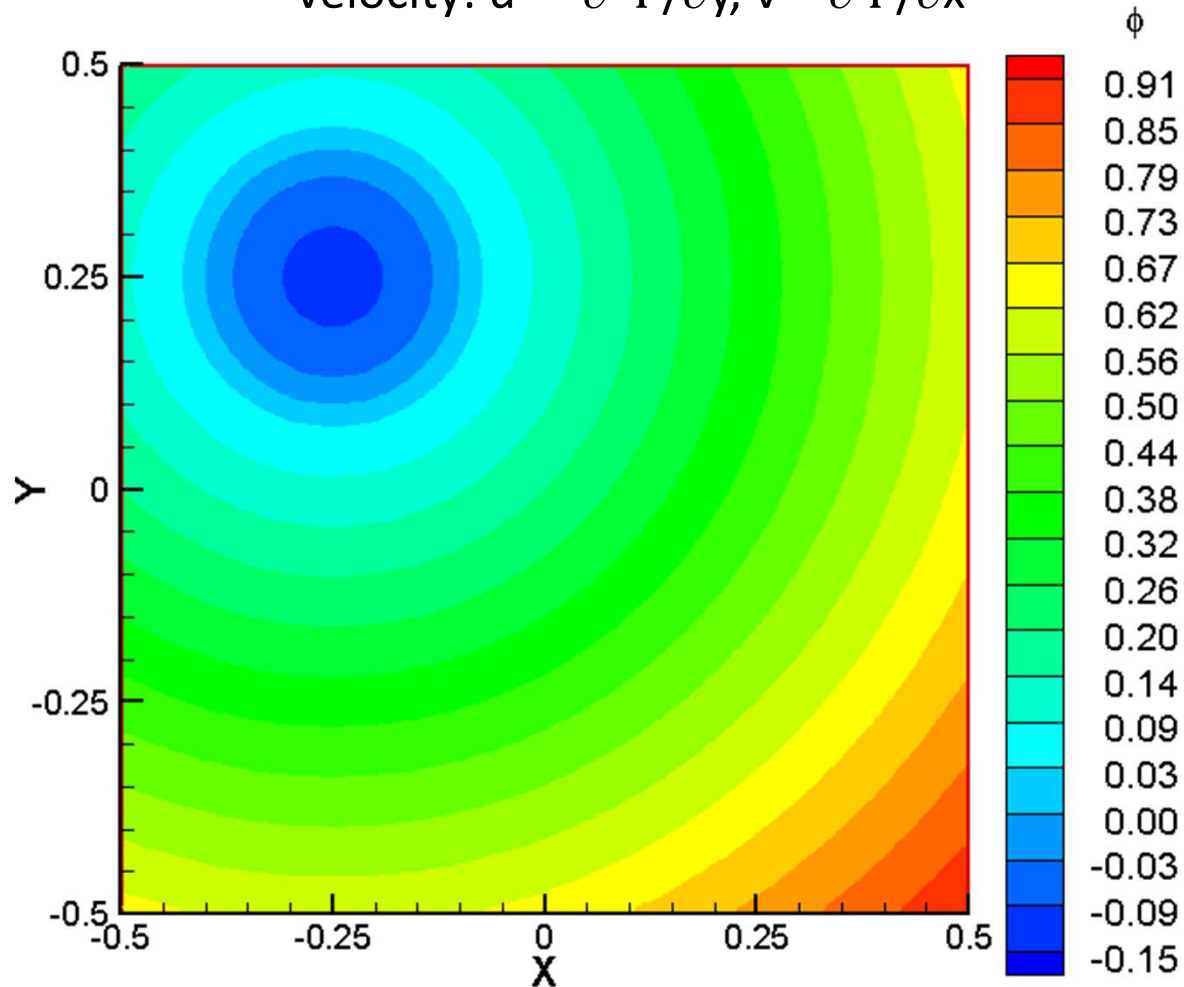
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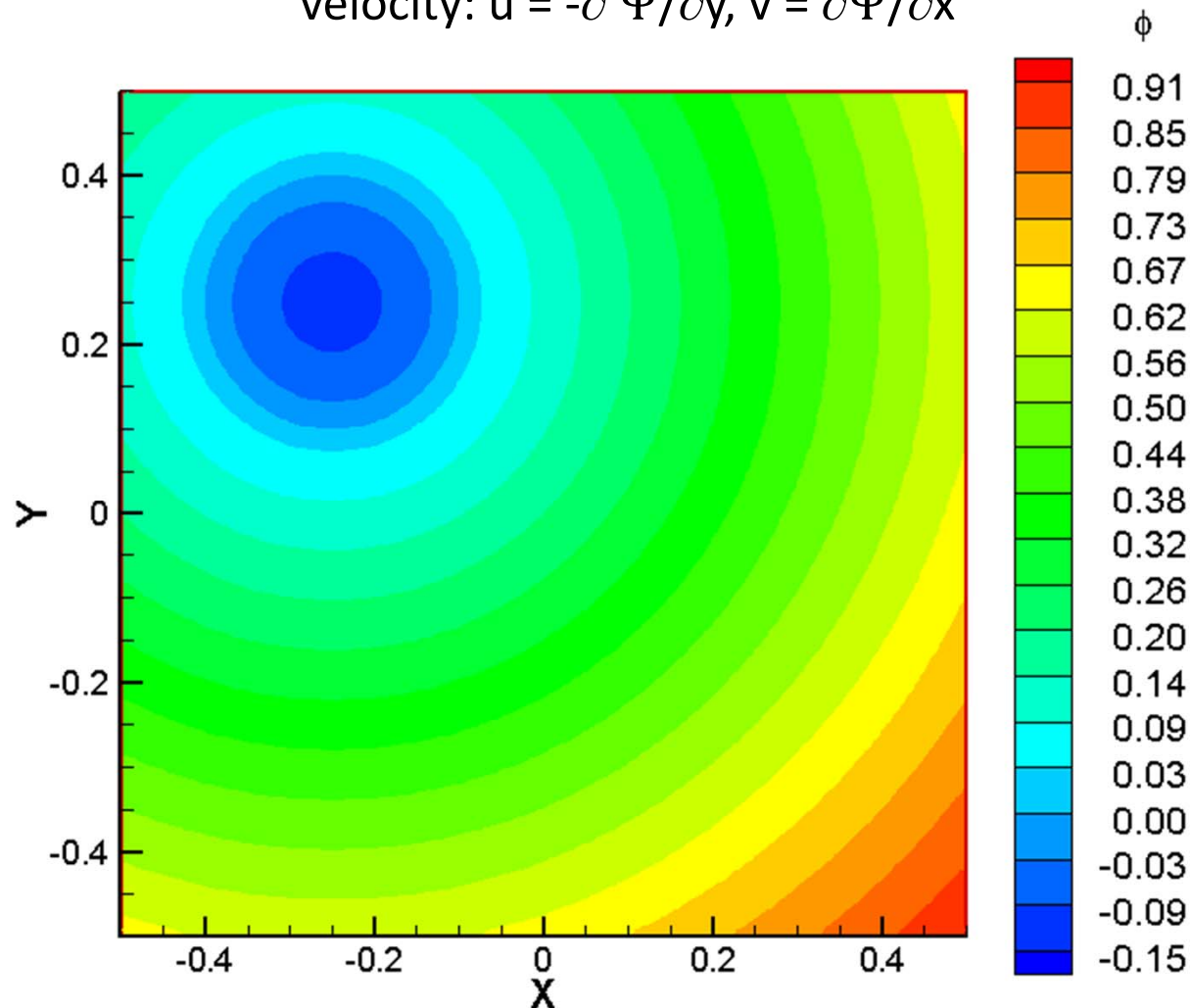
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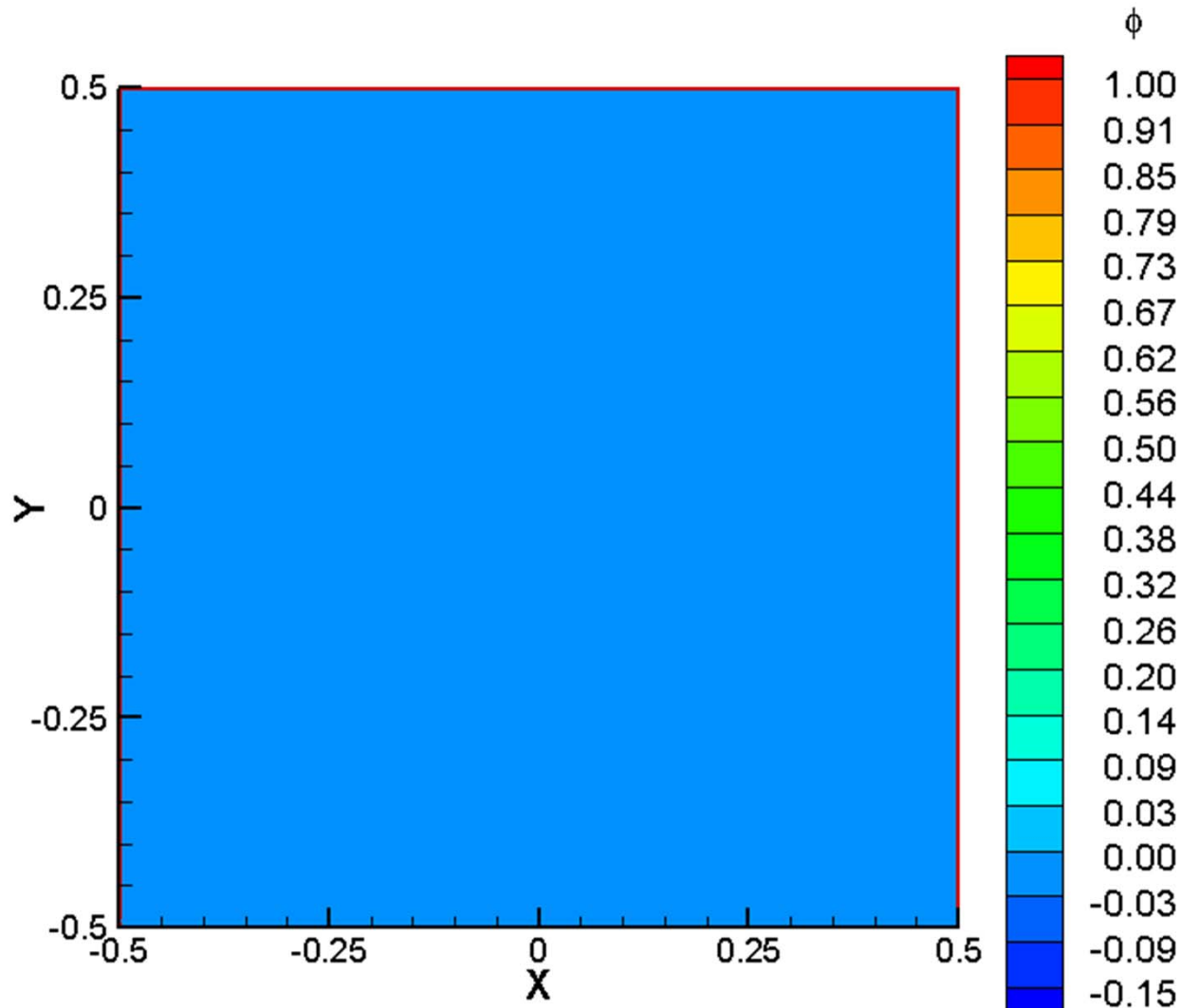
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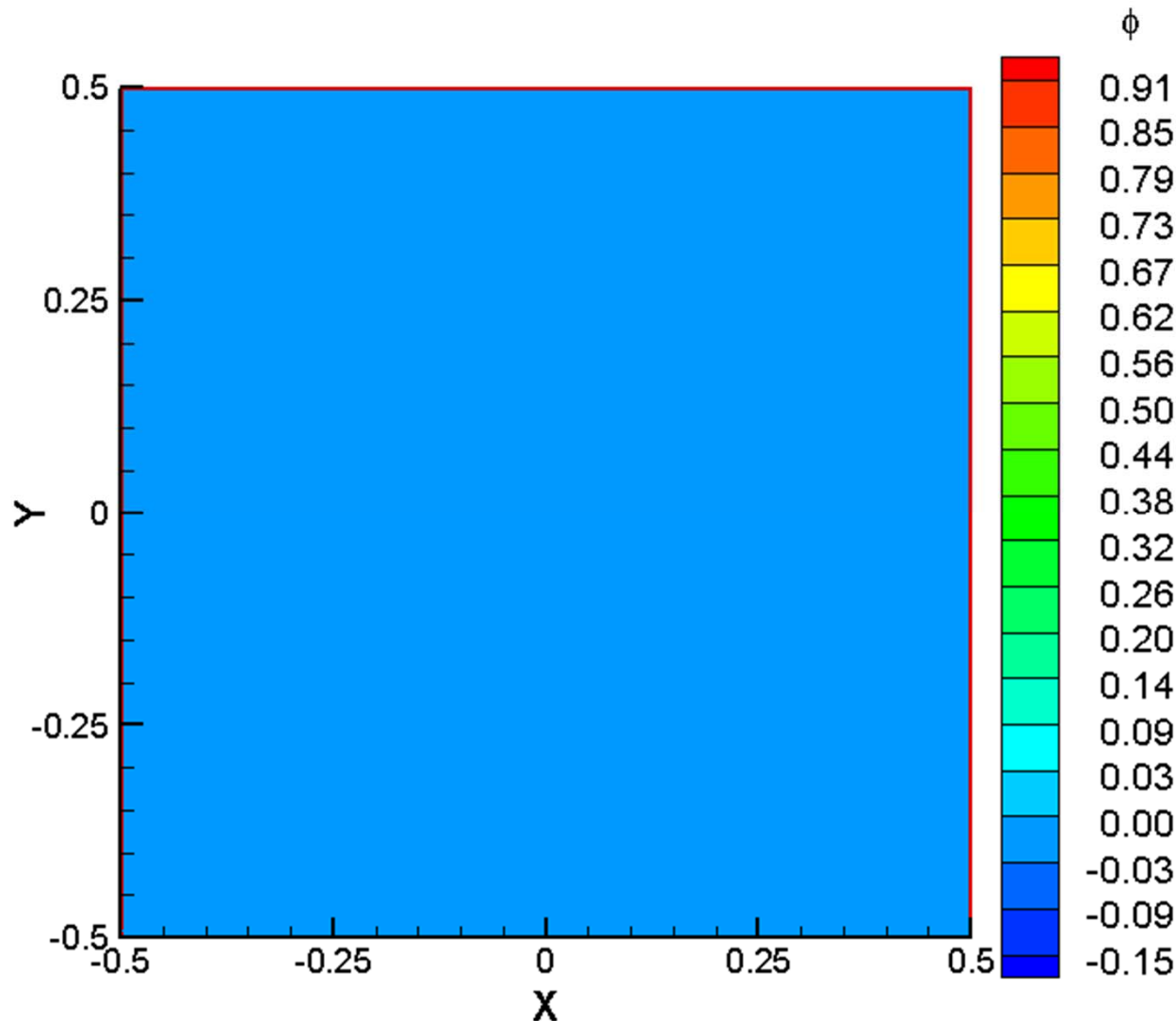
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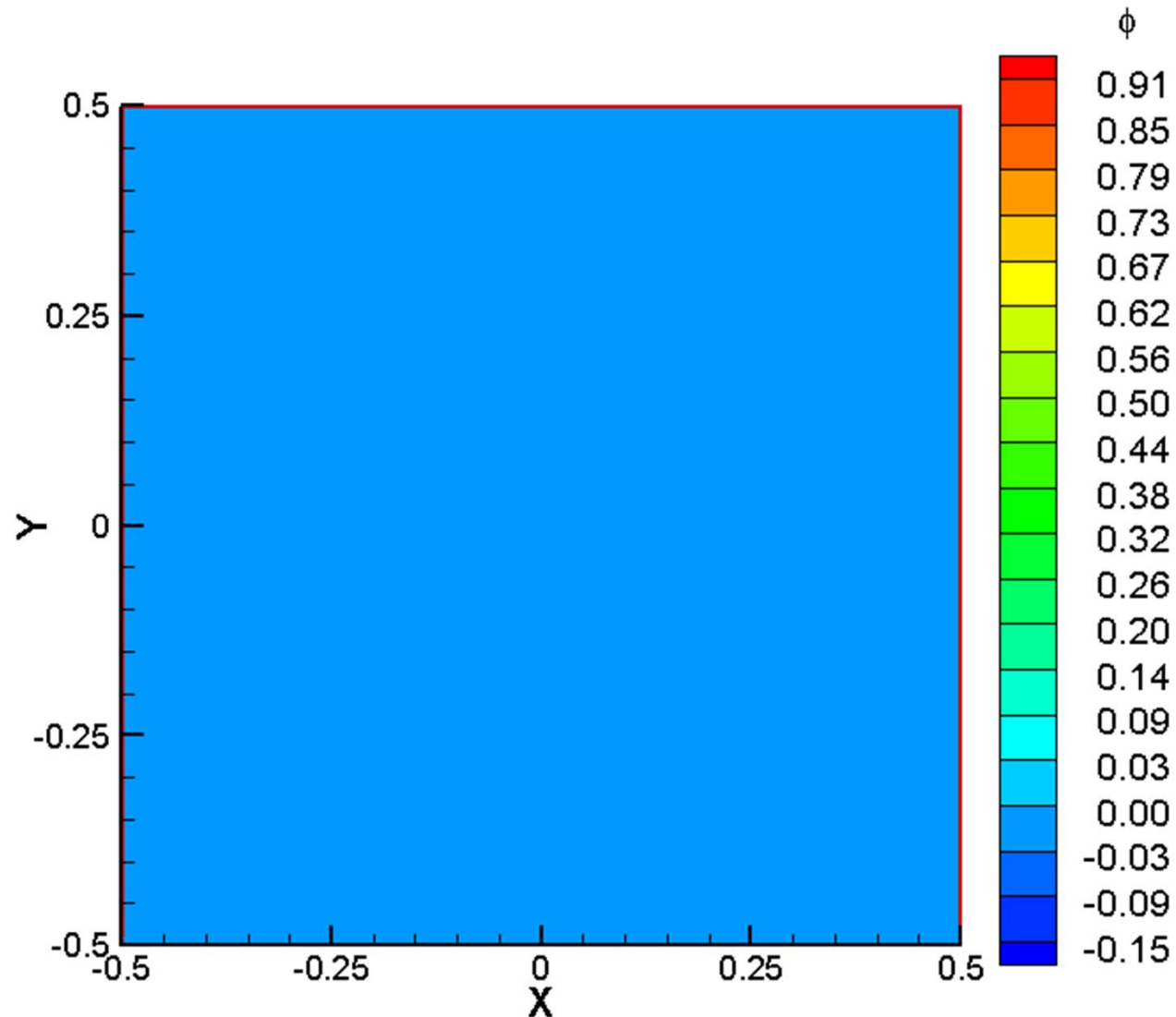




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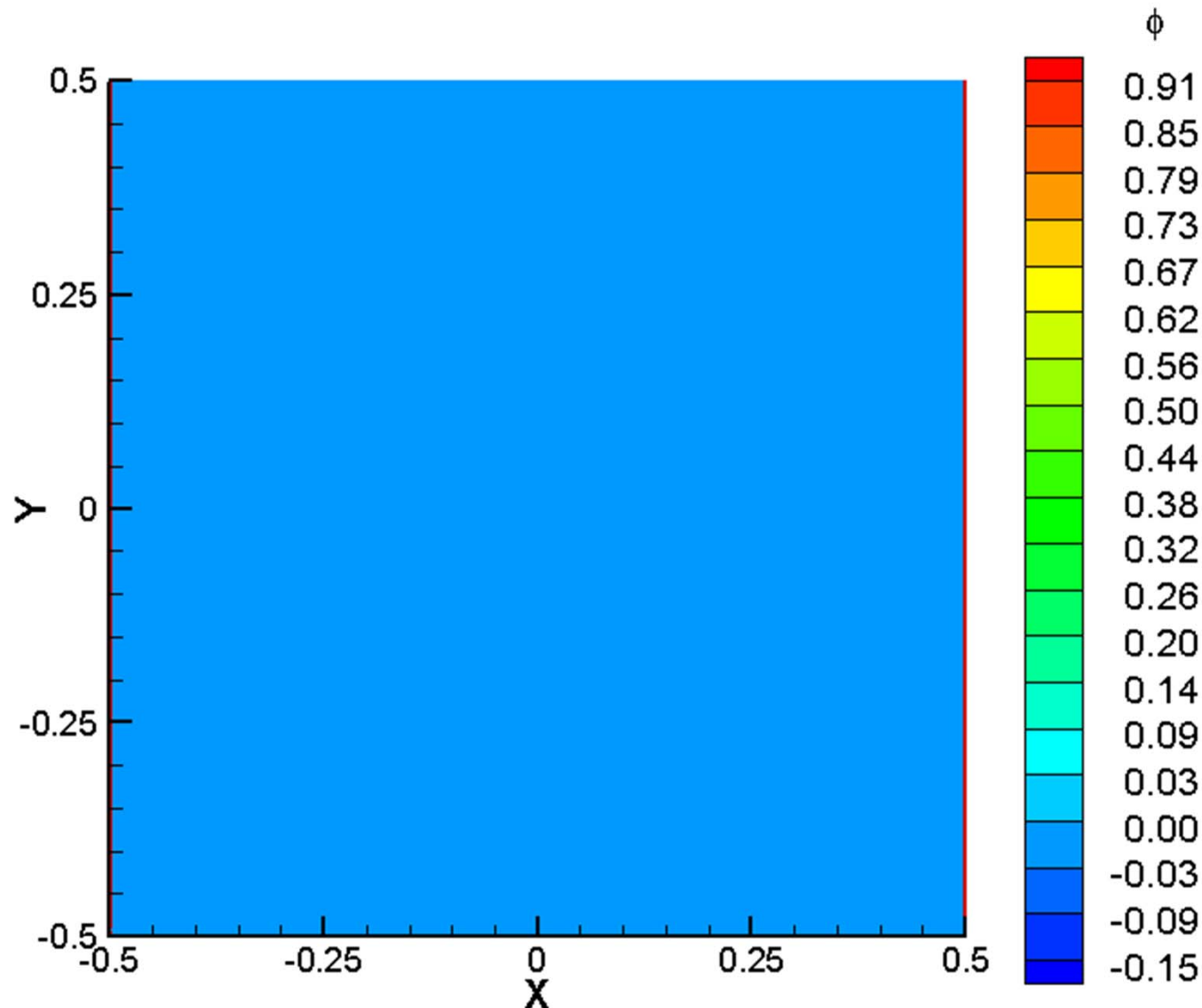
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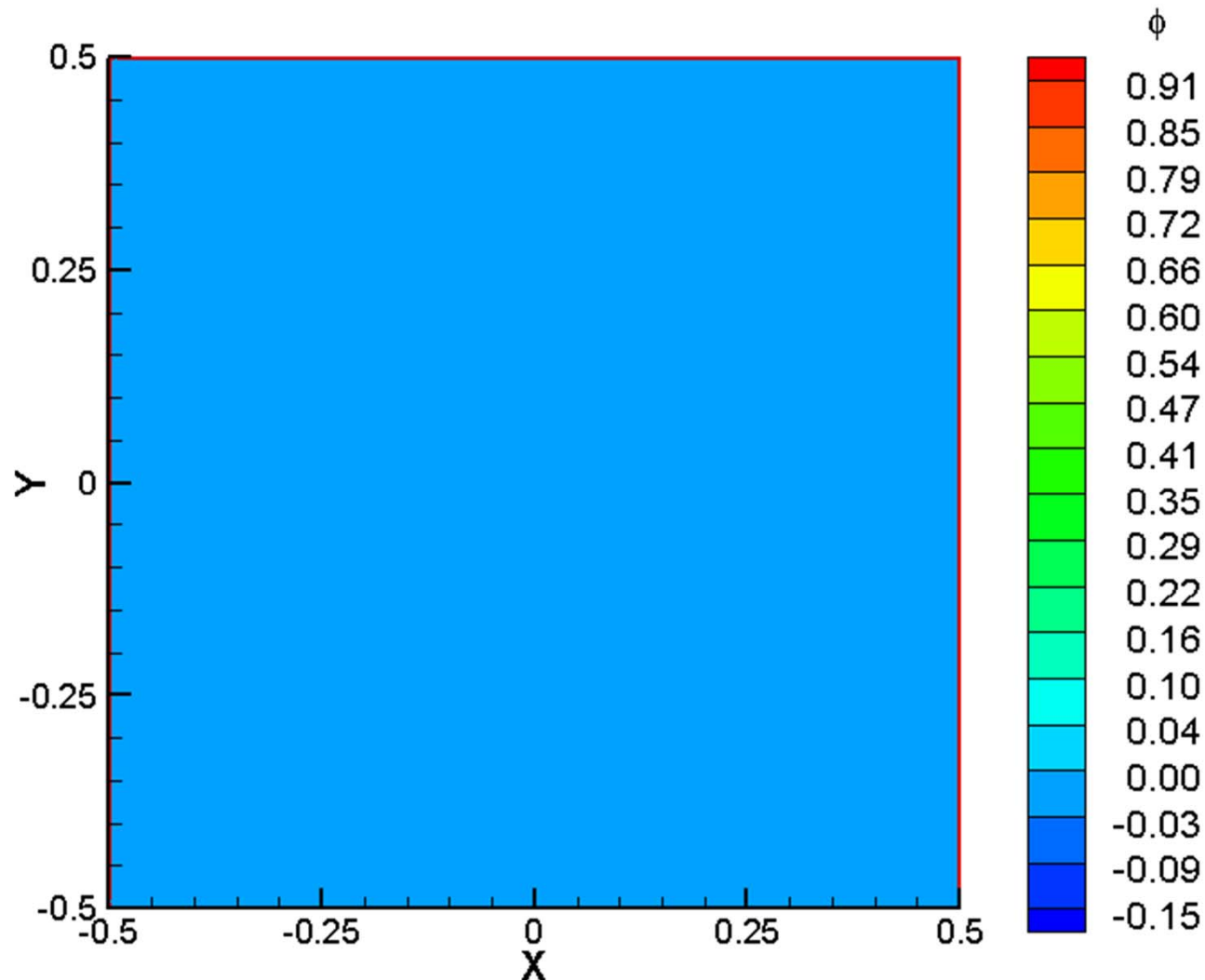
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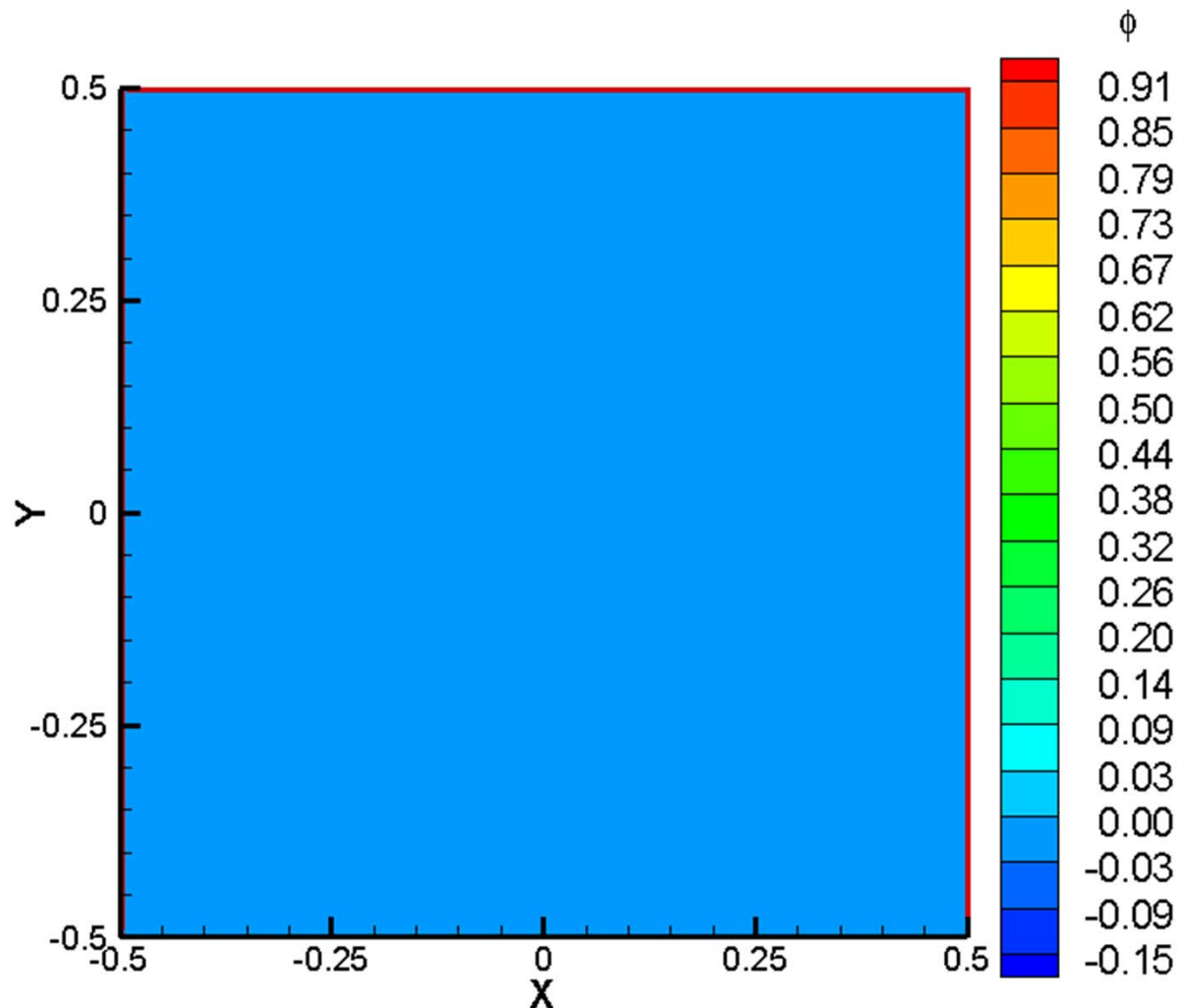
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