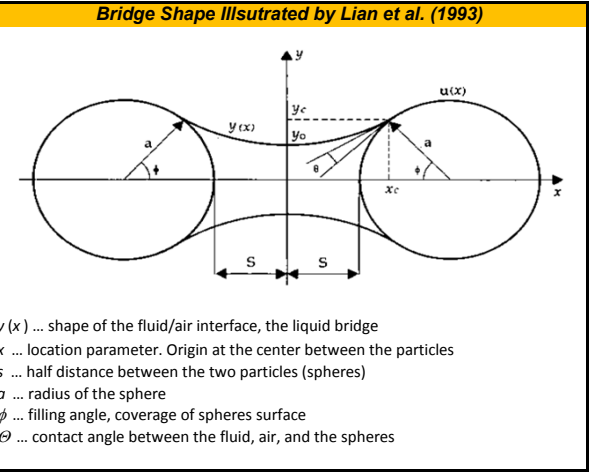


# Numerical Solution of the Laplace-Young-Equation for Liquid Bridges

issued for FWF Project "The Virtual Sandbox", WKP 67  
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Theoretical Information	
The Laplace-Young equation, describing the form of the liquid bridge between to spherical particles is evaluated numerical. The evaluation follows the paper of Lian et al. (J. Clo.Int.Sci., 1993, 161, 138-147).	
Input Parameters	
Dimensionless cap pressure, $H^*$	0.5
Contact angle, $\Theta$	40
Filling angle, $\phi$	25
Integration Parameters (for Grid Independence)	
Grid Points	100
$\Delta x$	1.24E-03



(1) Initial and Boundary Conditions	
Integration Constant C	0.4723
y0 :	0.3945 : initial height y0 at x0
yC :	0.4226 : height yC at critical xC
yDotC :	0.4663

(2) Find Critical Position xC	
xC :	0.1243
yVal :	0.4226
error yVal :	1.66E-07

(3) Run the Integration with given Step Wide Δx												
Position of the liquid interface in dependence on the x position is given and saved in sheet "BridgeShape".												
Only the last integration result is printed in the table below.												
	<table><tr><th>iCount</th><th>x</th><th>y</th><th>yDot</th><th>yDotDot</th></tr><tr><td>Current :</td><td>100</td><td>0.1243</td><td>0.4226</td><td>0.4662</td><td>3.3662</td></tr></table>	iCount	x	y	yDot	yDotDot	Current :	100	0.1243	0.4226	0.4662	3.3662
iCount	x	y	yDot	yDotDot								
Current :	100	0.1243	0.4226	0.4662	3.3662							

(4) Post Processing - Bridge Volume	
The liquid volume is calculated from the integral of every step summed up.	
Liquid Volume of the Bridge :	

(5) Post Processing - Bridge Shape	
The shape of the upper right quarter of the bridge is drawn.	
With x and y data from Sheet "BridgeShape"	

