Discussion: 3 D Hg Jet Simulation

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May 15, 2014
Simplification Of The 3D Hg Jet

- Dimensional model (unit: inch)
- Non-dimensional model (normalized by $D_{jet\,exit}$)
- Simplified model (normalized by $D_{jet\,exit}$)
Boundary Conditions

- **Velocity Inlet**: Normalized by $D_{\text{jet exit}}$, which is 0.01 meter. No gravity in the model.

- **Wall**:

- **Pressure Outlet**: $u = U + \sqrt{2k/3}$, where $k = \frac{1}{2} (u'^2 + v'^2 + w'^2)$

Pipe simulation
Results of $\alpha_{Hg}$ at $t = 0$ ms

(1) $z = 0$ cm

(2) $z = 1$ cm

(3) $z = 5$ cm

(4) $z = 10$ cm

(5) $z = 15$ cm

(6) $z = 60$ cm

(7) $z = 30$ cm

(8) $z = 45$ cm

Contour of $\alpha_{Hg}$ at different $z$ location:
(1) $z = 0$ cm (2) $z = 1$ cm
(3) $z = 5$ cm (4) $z = 10$ cm
(5) $z = 15$ cm (6) $z = 20$ cm
(7) $z = 30$ cm (8) $z = 45$ cm.

Note $z = 30$ and $45$ cm refer to the location of viewport 2 and 3, respectively.
Results of $\alpha_{\text{Hg}}$ at $t = 4.8$ ms (1/5 time through)

Contour of $\alpha_{\text{Hg}}$ at different $z$ location:

(1) $z = 0$ cm
(2) $z = 1$ cm
(3) $z = 5$ cm
(4) $z = 10$ cm
(5) $z = 15$ cm
(6) $z = 20$ cm
(7) $z = 30$ cm
(8) $z = 45$ cm.

Note $z = 30$ and $45$ cm refer to the location of viewport 2 and 3, respectively.
Results of $\alpha_{\text{Hg}}$ at $t = 9.6$ ms (2/5 time through)

Contour of $\alpha_{\text{Hg}}$ at different z location:
(1)z = 0 cm (2)z = 1 cm
(3)z = 5 cm (4)z = 10 cm
(5)z = 15 cm (6)z = 20 cm
(7)z = 30 cm (8)z = 45 cm.

Note z = 30 and 45 cm refer to the location of viewport 2 and 3, respectively.
Contour of $\alpha_{\text{Hg}}$ at different $z$ location:

1) $z = 0$ cm (2) $z = 1$ cm
2) $z = 3$ cm (4) $z = 10$ cm
3) $z = 5$ cm (5) $z = 15$ cm
4) $z = 30$ cm (6) $z = 15$ cm
5) $z = 45$ cm (7) $z = 30$ cm

Note $z = 30$ and $z = 45$ cm refer to the location of viewport 2 and 3, respectively.

Results of $\alpha_{\text{Hg}}$ at $t = 25$ ms (one time through)