

**Ex:** Fuzzy logic is used to control a screw-down motor that controls how far apart rolls in a steel mill will be. The motor lacks feedback control and coasts into place. The objective of the fuzzy logic system is to output the time that the motor should be turned off so that it will end up at the correct final position. Friction on the mill varies with position.

Inputs:

size\_of\_move = how far the screws must travel, min 0, max 2.4"

final\_pos = the size of the final gap between rolls in mill, min 0, max 3.0"

Outputs:

stop\_dist\_est = the predicted stop distance of the screw-down motor

Endpoints of membership functions for size of move:

```
m_size_of_move = ...
[0.0, 0.2, 0.4; ...
 0.2, 0.4, 1.4; ...
 0.4, 1.4, 2.4];
```

Endpoints of membership functions for final position:

```
m_final_pos = ...
[0.00, 0.25, 0.50; ...
 0.25, 0.50, 1.75; ...
 0.50, 1.75, 3.00];
```

Expert's estimate of stop distances versus size of move and final position.

```
y_stop_dist = ...
[0.050, 0.030, 0.025; ... % small move
 0.070, 0.050, 0.040; ... % medium move
 0.080, 0.060, 0.048]; % large move
```

Fuzzy logic system for predicting stop distance

