EXAMPLE_WALKTHROUGH

The program uses numbers to select options and model your flow conditions. For example, I will model the normal flow of a rectangular channel with conditions as represented below. The following are steps followed:

1. Enter “HYDRUALICS_CODE” on the command window of MATLAB.

```
>> HYDRAULICS_CODE
```

2. Enter type of flow.

```
>> HYDRAULICS_CODE
This program was built by GAI JOK[CAID:44717938]
DISCLAIMER: For any quantity that does not displace units, the program is displaying or requiring the quantity in standard unit.
Flow type:
1. GRADUALLY VARYING FLOW.
2. NORMAL FLOW.
3. RAPIDLY VARYING FLOW.
Enter the number corresponding to the type of flow: 2
```

3. Enter the conditions specific to that flow.

```
>> HYDRAULICS_CODE
This program was built by GAI JOK[CAID:44717938]
DISCLAIMER: For any quantity that does not displace units, the program is displaying or requiring the quantity in standard unit.
Flow type:
1. GRADUALLY VARYING FLOW.
2. NORMAL FLOW.
3. RAPIDLY VARYING FLOW.
Enter the number corresponding to the type of flow: 2
WHAT IS THE SHAPE OF THE CHANNEL:
1. RECTANGLE.
2. TRIANGLE.
3. TRAPEZIUM.
4. CIRCLE.
5. COMPOSITE SHAPE.
Enter the number corresponding to the shape of the channel: 1
Enter the discharge:2
Enter manning's number:0.00179
Enter the streamline slope:2/1000
Enter the channel width:1.5
```

4. View of module of the flow.

```
>> HYDRAULICS_CODE
This program was built by GAI JOK[CAID:44717938]
DISCLAIMER: For any quantity that does not displace units, the program is displaying or requiring the quantity in standard unit.
Flow type:
1. GRADUALLY VARYING FLOW.
2. NORMAL FLOW.
3. RAPIDLY VARYING FLOW.
Enter the number corresponding to the type of flow: 2
WHAT IS THE SHAPE OF THE CHANNEL:
1. RECTANGLE.
2. TRIANGLE.
3. TRAPEZIUM.
4. CIRCLE.
5. COMPOSITE SHAPE.
Enter the number corresponding to the shape of the channel: 1
Enter the discharge:2
Enter manning's number:0.00179
Enter the streamline slope:2/1000
Enter the channel width:1.5
The normal depth is 0.188502.
Froude's number is 5.20153.
The critical depth is 0.565895.
The critical slope is 8.04161e-05.
The specific energy is 0.848843.
The normal depth is subcritical.
```

Gradually varying flow example

```
>> HYDRAULICS_CODE
This program was built by GAI JOK[CAID:44717938]
DISCLAIMER: For any quantity that does not displace units, the program is displaying or requiring the quantity in standard unit.
Flow type:
1. GRADUALLY VARYING FLOW.
2. NORMAL FLOW.
3. RAPIDLY VARYING FLOW.
Enter the number corresponding to the type of flow: 1
Solve for:
1. WIDTH GIVEN.
2. WIDTH UNKOWN.
Enter the number corresponding to if the width is given or not: 1
Enter the channel slope (S): 1/1000
Enter Manning's n: 0.002
Enter flow rate (Q in m^3/s): 4
Enter initial depth in meters: 10
Enter target depth in meters (or 0 to ignore): 30
Enter the channel width in meters: 5
Enter the number of steps for calculation: 4
The flow is supercritical with a steep slope.
Starting GVF calculations...
Step 1 - Depth: 15.0000 m, Distance: 4999.86 m
Step 2 - Depth: 20.0000 m, Distance: 9999.82 m
Step 3 - Depth: 25.0000 m, Distance: 14999.80 m
Step 4 - Depth: 30.0000 m, Distance: 19999.79 m

Total distance from the initial point to reach a depth of 30.00 m is approximately 19999.79 meters using 4 steps.
```

Rapidly varying flow example

```
>> HYDRAULICS_CODE
This program was built by GAI JOK[CAID:44717938]
DISCLAIMER: For any quantity that does not displace units, the program is displaying or requiring the quantity in standard unit.
Flow type:
1. GRADUALLY VARYING FLOW.
2. NORMAL FLOW.
3. RAPIDLY VARYING FLOW.
Enter the number corresponding to the type of flow: 3
Flow condition:
1. WEIR.
2. CONSTRICTION.
3. EXPANSION.
4. SLUICEDGATES.
5. BRIDGE.
6. BLOCKS.
7. SPILLWAY.
Enter the number corresponding to the flow condition: 4
Solve for:
1. Only downstream depth given.
2. Both downstream and upstream depths given.
3.Only upstream depth given.
Enter the number corresponding to the known variable: 1
Enter the discharge (Q) in cubic meters per second: 4
Enter manning's number:0.02
Enter the streamline slope:5/1000
Enter the channel width (b): 3
Enter the depth downstream: 2
The normal depth is 0.642414.
The critical depth is 0.565895.
The critical slope is 0.00726953.
The total head given downstream depth is 2.02265m.
The depth upstream is 2m.
The velocity of flow upstream is 0.666667 m/s.
Froude's number upstream is 0.150508.
Froude's number downstream is 0.150508.
The force on the gate is 4.95611e-09.
The hydrualic jump will not occur upstream.
```

NOTE: With the program able to represent many shapes and different types of flow conditions, the above is just a small insight on the capability of the program.