**Exercise : Flow rate determination in a meshed-type network**

Every flow rate in each section has to be determined, with respect of the demand of the inhabitants (flow rate outputs). The solution will be discussed regarding the nodes pressures (pressures range between 2 and 6 bars for normal supplies).

Friction losses will be calculated with Hazen and Williams formula:

Head loss J (m/m):

$$J=10.69×\frac{Q^{1.85}}{Chw^{1.85}D^{4.87}}$$

With Chw friction coefficient of the material

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Section | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Diameter (m) | 0.5 | 0.5 | 0.4 | 0.3 | 0.4 | 0.3 | 0.6 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 |
| Length (m) | 900 | 900 | 900 | 900 | 900 | 900 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| Chw | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |



**Procedure, first steps:**

-Choose an arbitrary flow direction in each section

-Write the mass conservation for each node

-Choose the unknown to find

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