

Tutorial 2 Microfluidics

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1. **Watch** carefully the following introductory videos on microfluidics: Short introduction to microfluidics plus 3 videos are available on youtube here: [Video 1](https://www.youtube.com/watch?v=b8zE2i755-k) (<https://www.youtube.com/watch?v=b8zE2i755-k>), [Video 2](https://www.youtube.com/watch?v=68p3qAm4i7U) (<https://www.youtube.com/watch?v=68p3qAm4i7U>), and [Video 3](https://www.youtube.com/watch?v=EYuyRUjnTgc) (<https://www.youtube.com/watch?v=EYuyRUjnTgc>).
2. **Index Notation** Use the index notation and show that these are equalities:
 - A.
$$\frac{\partial}{\partial x_i} (p \delta_{ij}) = (\nabla p)_j$$
 - B.
$$\nabla \cdot (\rho \vec{u}) = (\nabla \rho) \cdot \vec{u} + \rho \nabla \cdot \vec{u}$$
3. **Numerical solver for pathlines** Work through the [following notebook](#) ([02a%20Euler%20Method.ipynb](#)) (02a Euler Method.ipynb). Understand the programs and implement a flowfield of your choice. Show the solution.