Extraction **Grounding** **Comparison** **Augmentation**

Source Text

4.4. Changing the fluid viscosity (Re). Finally, in this case we consider what happens if we put the swimmer in less or more viscous fluid. Examples of highly viscous fluids include things like honey or corn syrup, or fluids that are generally "thicker" or "more sticky", when less viscous fluids, like water so. For these numerical experiments we keep all other parameters the same, i.e., all the interpolation parameters, geometry, etc. We considered fluid dynamic viscosities, μ, across 5 orders of magnitude from 0.05 to 5000. Note that the viscosity considered in all previous cases (Sections 4.1-4.3) was $\mu = 10$.

As briefly stated earlier, this is equivalent to varying the Reynolds Number, Re, which describes the ratio of inertial to viscous forces, which quantitatively is given by

(4.2) $\qquad Re = \frac{\rho V L}{\mu}$

Note that ρ and μ are the fluid's density and dynamics viscosity, while L and V are characteristic length and velocity scales for the system. We will not go into more depth regarding Reynolds Number; more information regarding Re "scaling" studies can be found in [12, 18, 10, 7, 6]. Let's see how these idealized swimmer's perform in different viscosities!

Source Code

```
1  **********************************************************
2  *   UPDATE_EST - Updates the estimated yield of magic beans given
3  *       some additional amount of rainfall
4  **********************************************************
5  *
6  *   VARIABLES
7  *
8  *   INPUT RAIN     = Additional rainfall
9  *
10 *   INOUT YIELD_EST = Crop yield to update
11 *
12 **********************************************************
13     SUBROUTINE UPDATE_EST(RAIN, TOTAL_RAIN, YIELD_EST)
14     DOUBLE PRECISION RAIN, YIELD_EST, TOTAL_RAIN
15     TOTAL_RAIN = TOTAL_RAIN + RAIN
16
17 *   Yield increases up to a point
18     IF(TOTAL_RAIN .le. 40) THEN
19         YIELD_EST = -(TOTAL_RAIN - 40) ** 2 / 16 + 100
20
21 *   Then sharply declines
22     ELSE
23         YIELD_EST = -TOTAL_RAIN + 140
24     ENDIF
25
26     END SUBROUTINE UPDATE_EST
27
```

Machine Reading

Equation Reading

Program Analysis

Code Summarization

Intermediate Representation

GrFN

Lambdas

Model Analysis

Sim/Diff

Sensitivity

Executable DBN

Model Choice

Model Composition