Introduction
The difficulty in constitutive modelling of polymer melts is to get a correct non-linear behaviour in both elongation and shear. The recently proposed Pom-Pom model [1], is a major step forward in solving this problem. In this work an extension is proposed to improve the performance of the Pom-Pom model. Eventually, the objective is to calculate visco-elastic polymer melt flows in characteristic geometries under processing conditions.

The Pom-Pom model
The model is based on the schematic configuration of figure 1.

Uniaxial elongation
The non-linear parameters, $q$ and $\Lambda_{\text{as}}$, are fitted on uniaxial elongational data [3] only.

Simple Shear
Without changing the parameters, the correct behaviour for shear data [4] is predicted.

Complex flow
A complex flow with combined shear/elongation regions, the cross slot flow, is investigated.

Conclusions
- Excellent quantitative agreement in both elongation and shear.
- Smooth results, by eliminating maximum stretch condition.
- Fitting of non-linear parameters $q$ and $\Lambda_{\text{as}}$ on uniaxial experimental data only.
- Good quantitative performance in complex flow.

References: