Short report on how MVSK relates to POP

In response to the two following statements

"probably better if I do not talk too much on how we are approaching it, rather focus on the problem itself."

I do not know what would be revealing too much. I would state the multi-objective problem:
""""

$$\begin{aligned} \max\ & f_1(w) := w^T\mu \\ \min\ & f_2(w) := w^T\Phi^{(2)}w \\ \max\ & f_3(w) := w^T\Phi^{(3)}(w\otimes w) \\ \min\ & f_4(w) := w^T\Phi^{(4)}(w\otimes w\otimes w) \\ s.t.\ & w\in\Delta^N \end{aligned} \tag{0}$$

where $\mu, \Phi^{(2)}, \Phi^{(3)}$, and $\Phi^{(4)}$ are appropriate data matrices.
""""
And then observe that all the constraints and objectives can be expressed as polynomials. Hence, the problem can be attacked using polynomial optimization (POP). The added benefit is that POP gives bounds on global optimality in contradistinction to many current techniques.

If you wish to reveal more, you can say:

""""
... the problem can be phrased as:

$$\begin{aligned} \not{f}_{\min} := \min\ \not{f}(w) := & \left(1-\frac{f_1(w)}{f_{1,\max}}\right)^{\lambda_1} + \left(\frac{f_2(w)}{f_{2,\min}}-1\right)^{\lambda_2} \\ & + \left(1-\frac{f_3(w)}{f_{3,\max}}\right)^{\lambda_3} + \left(\frac{f_4(w)}{f_{4,\min}}-1\right)^{\lambda_4} \\ s.t.\ & w\in\Delta^N \end{aligned} \tag{5}$$

The above, in turn, can be expressed as a signomial optimization problem. Observe that signomial optimization is a special case of polynomial optimization.
""""

"have you gathered or written more materials on what is MVSK portfolio construction and how it's related to polynomial optimization?"

I have not written more than there is on the git currently. As for sources, the only new source I have gotten is :

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But I have not parsed this document yet.