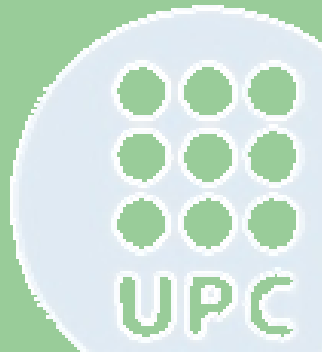


Fuel consumption assessment for speed variation concepts during the cruise phase

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Motivation

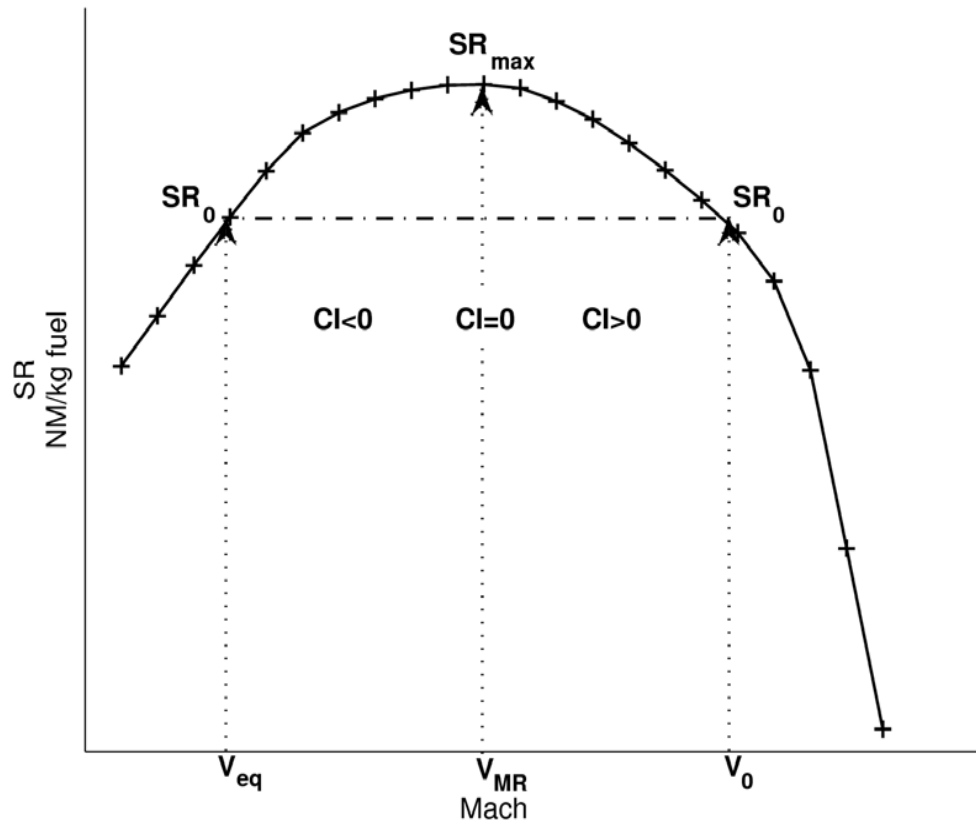
- Traffic grow
- Imbalance demand-capacity
- New concepts to deal with traffic based on 4D traj.:
 - BDT, SBT, RBT
 - ERASMUS
 - TC-SA
 - ...
- Extra fuel consumption

Presentation Outline

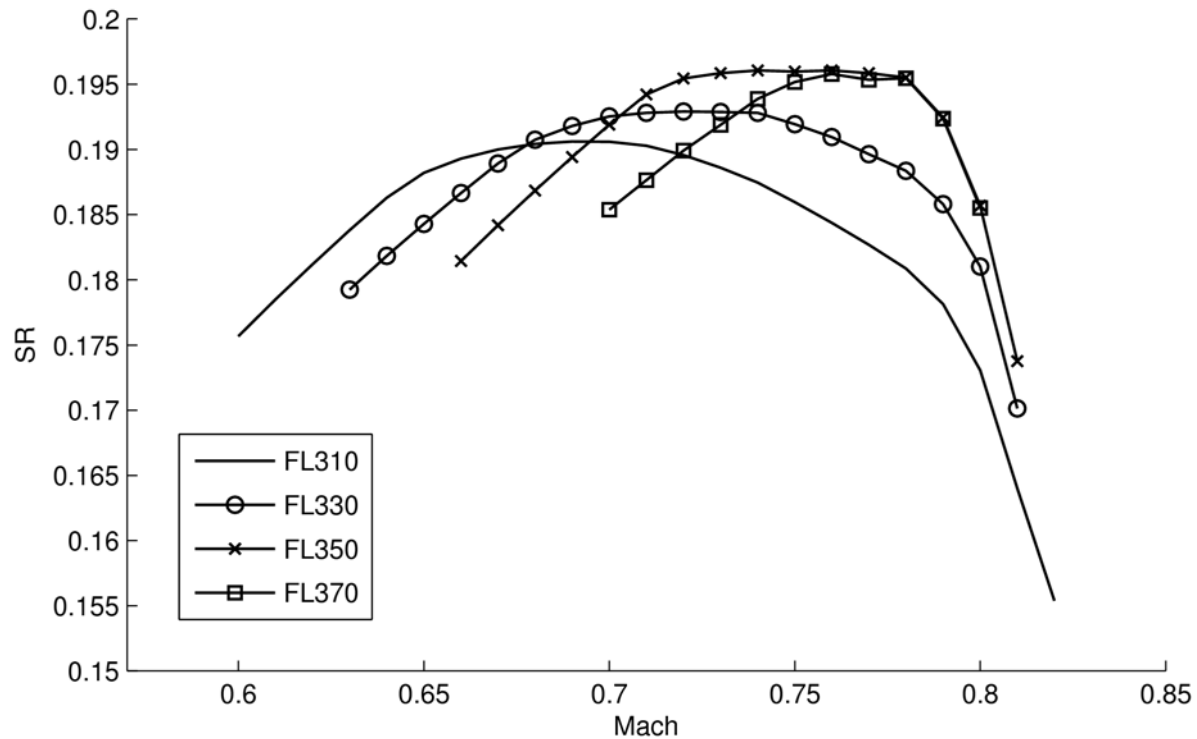
- Threats and Opportunities on speed variation
- Influencing parameters
- Application examples
- Cost Index sensitivity
- Conclusions and future work

Threats and Opportunities on speed var.

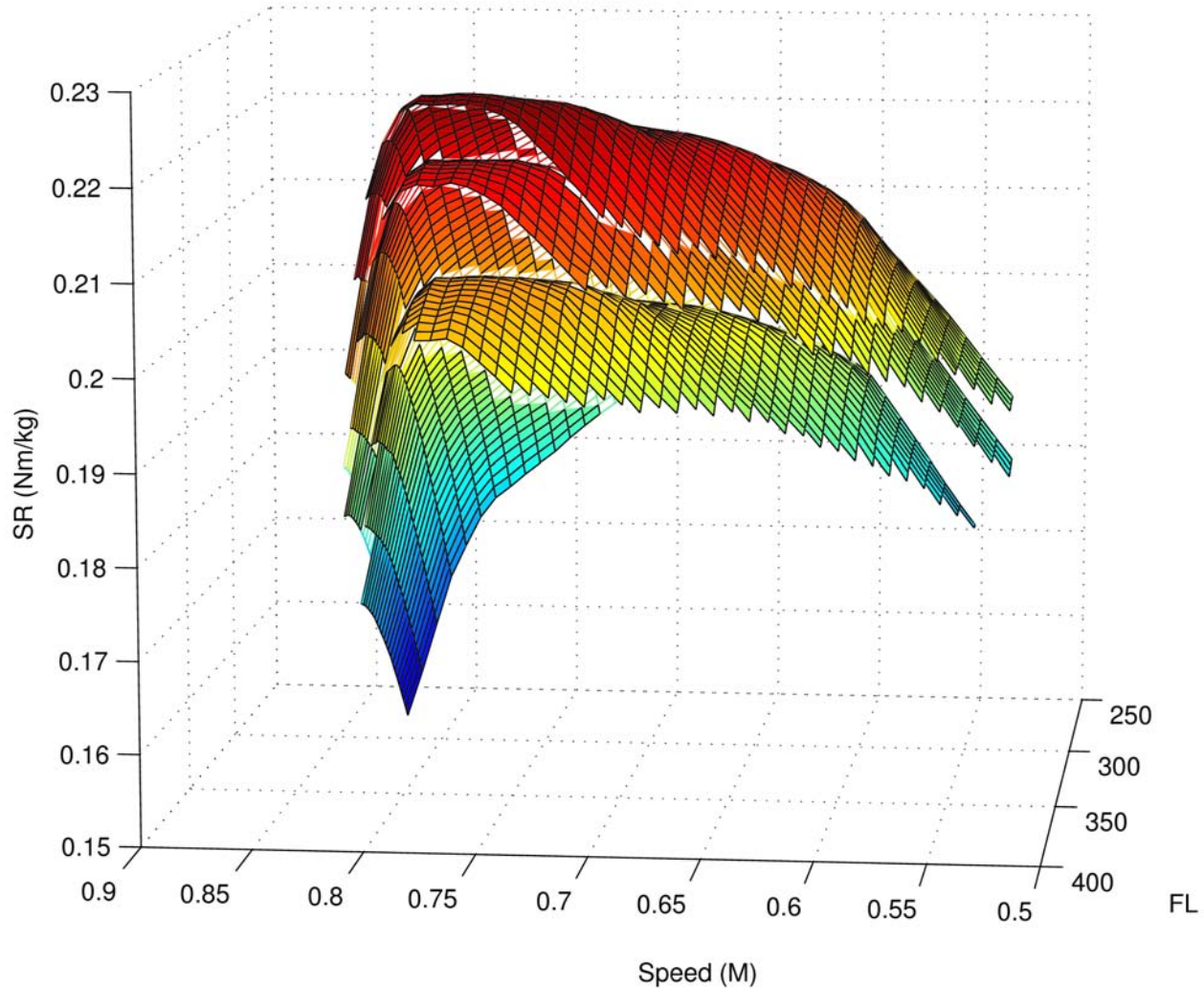
- Specific Range



Influencing parameters

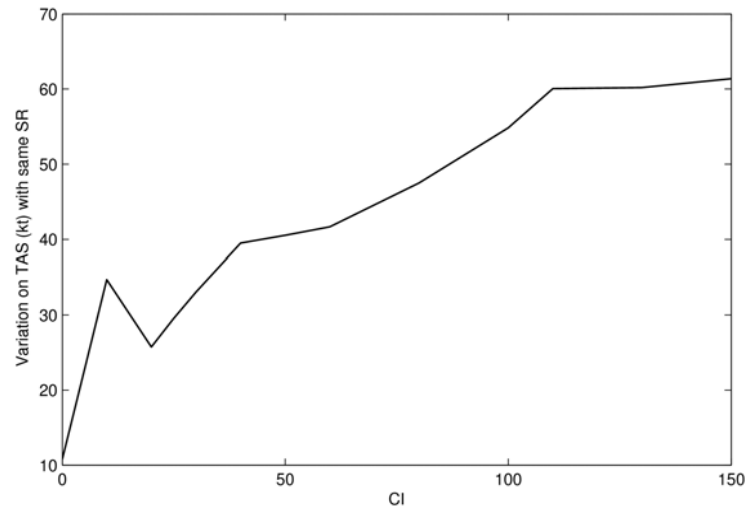
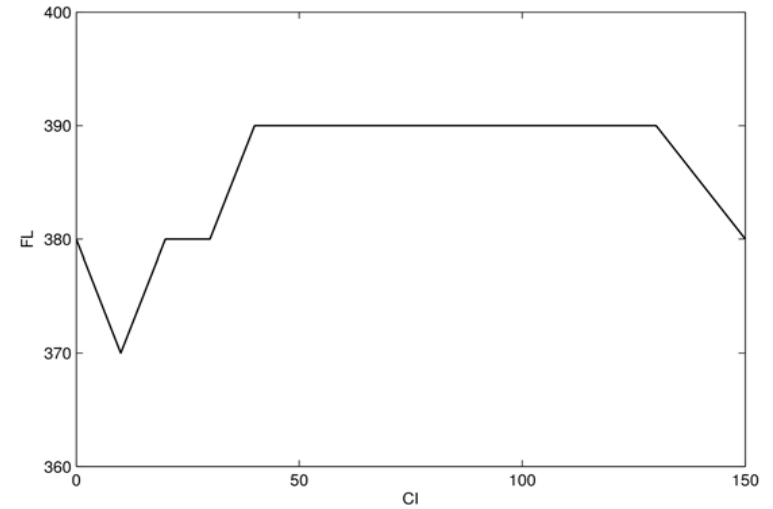
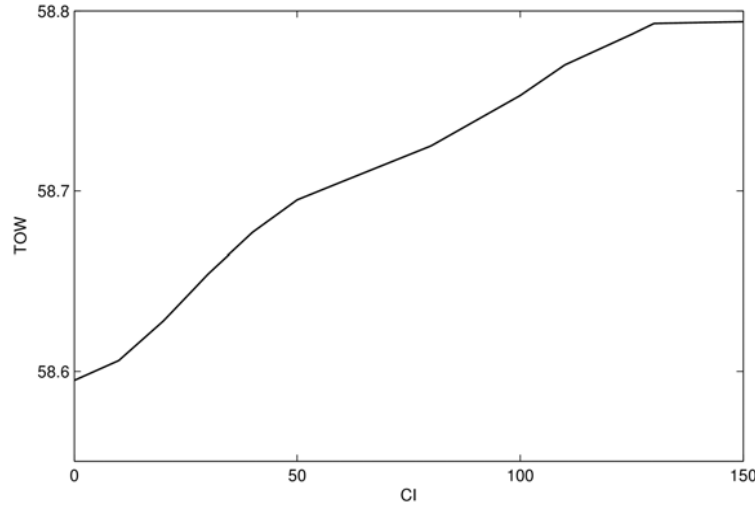


Influencing parameters



Influencing parameters

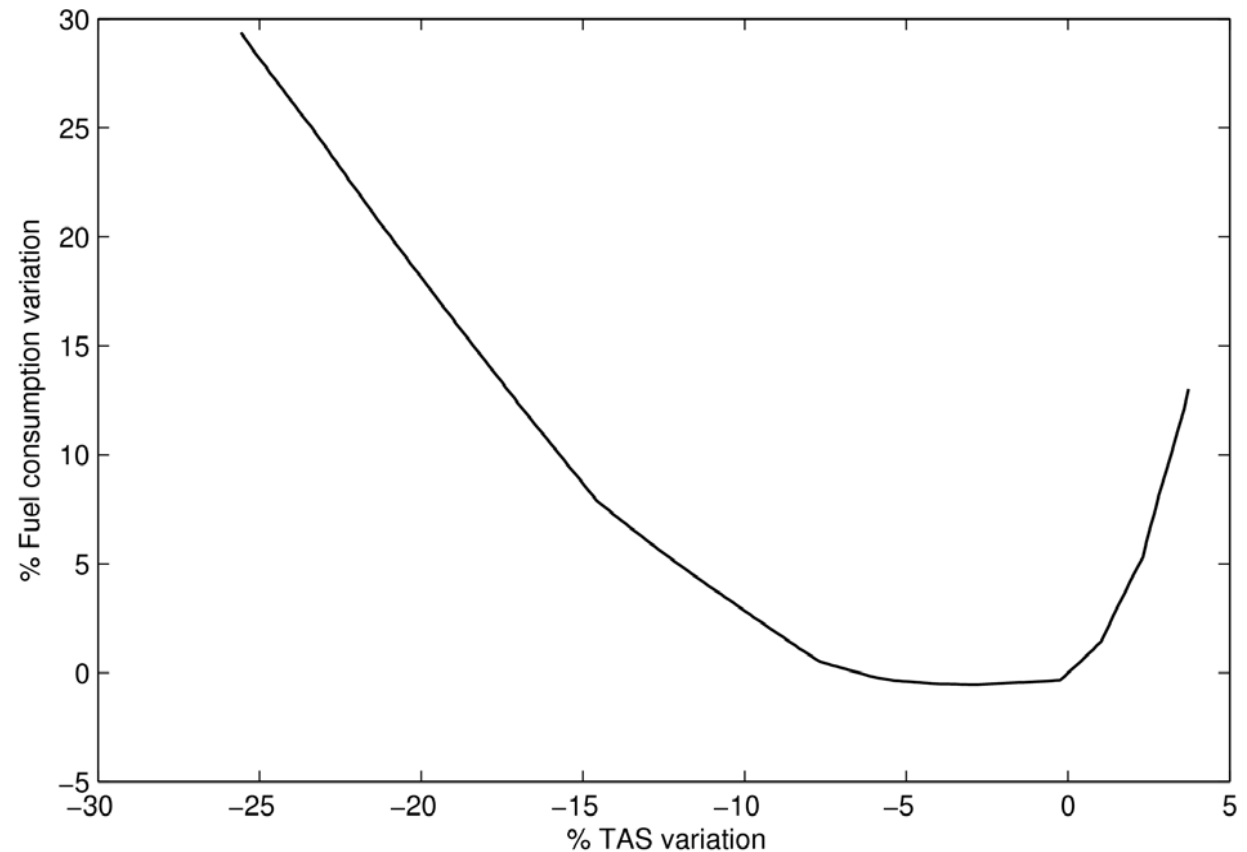
● CI ORY-NCE



Application Examples

● FCO-CDG:

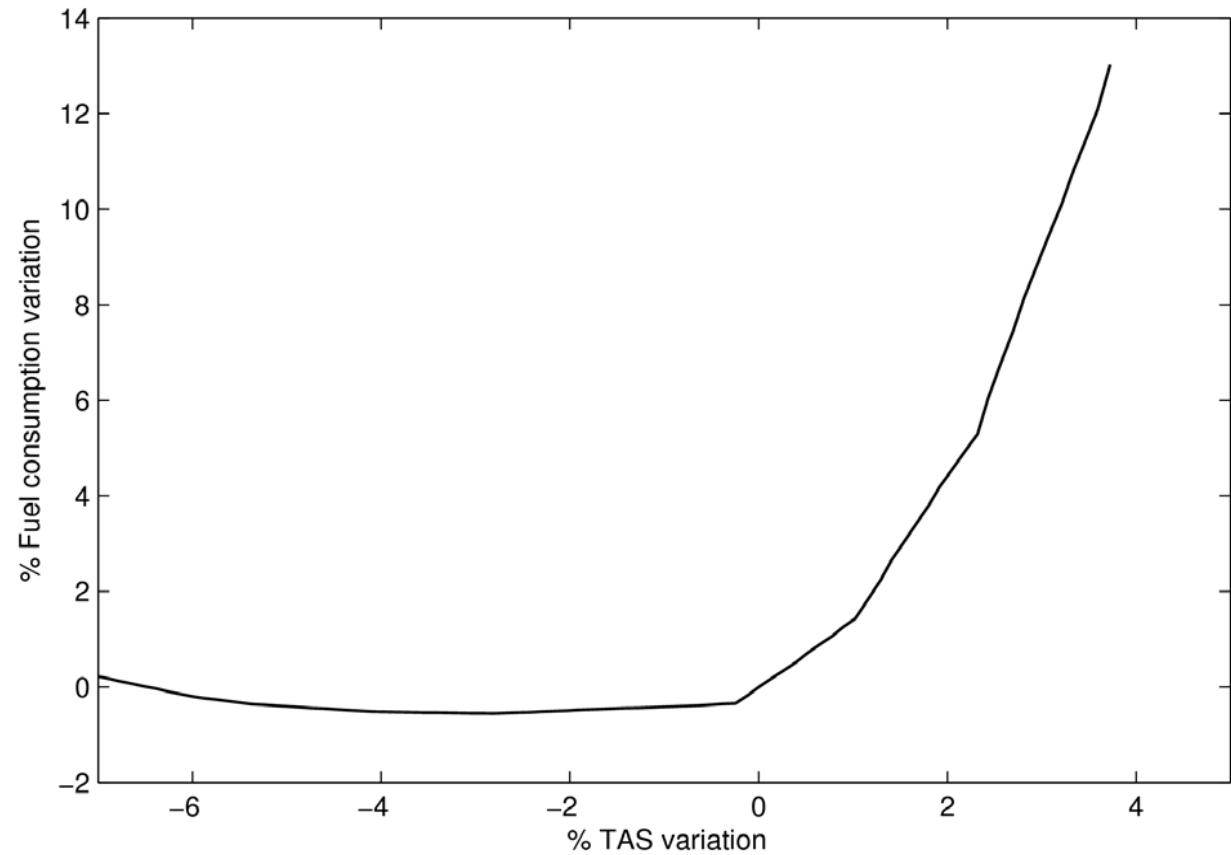
- A320
- CI 25
- FL 380
- V_0 0.78



Application Examples

● FCO-CDG:

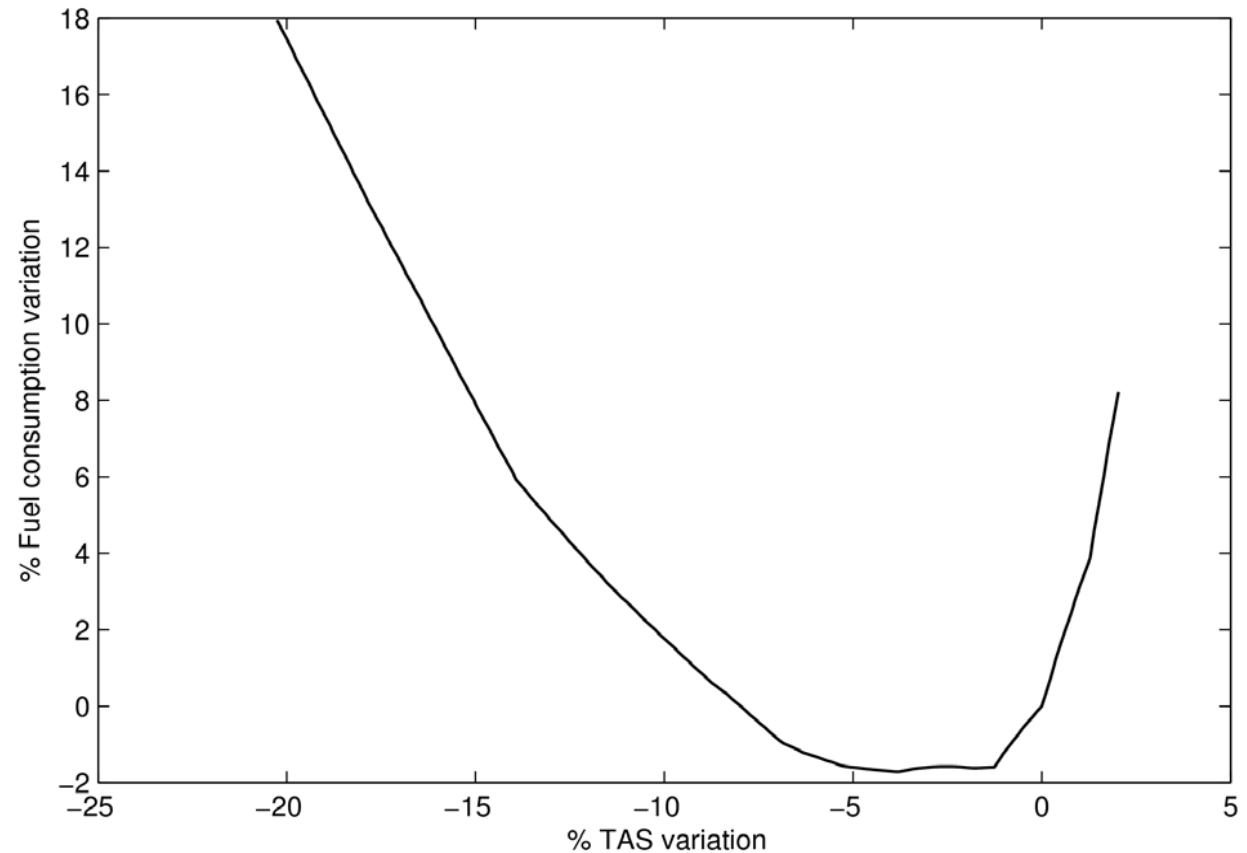
- A320
- CI 25
- FL 380
- V_0 0.78



Application Examples

● ORY-NCE:

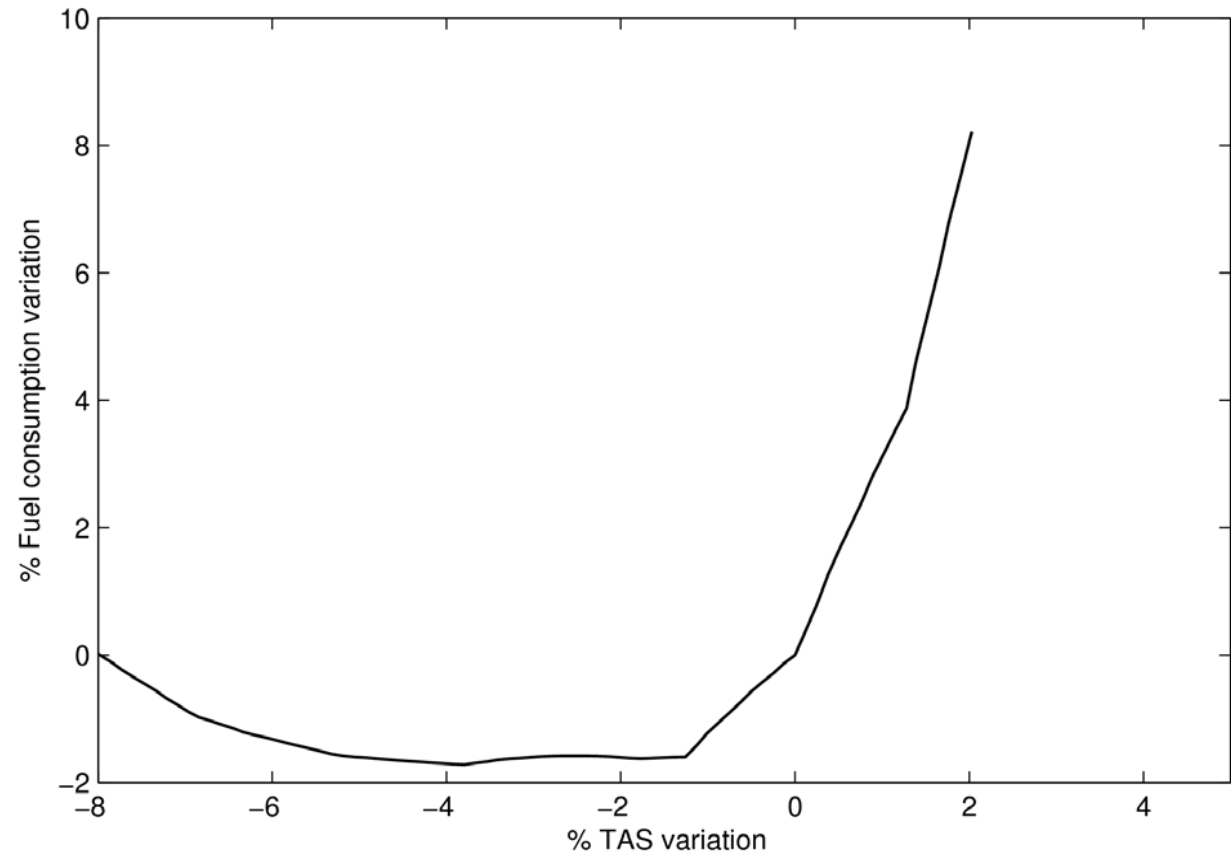
- A320
- CI 60
- FL 390
- V_0 0.79



Application Examples

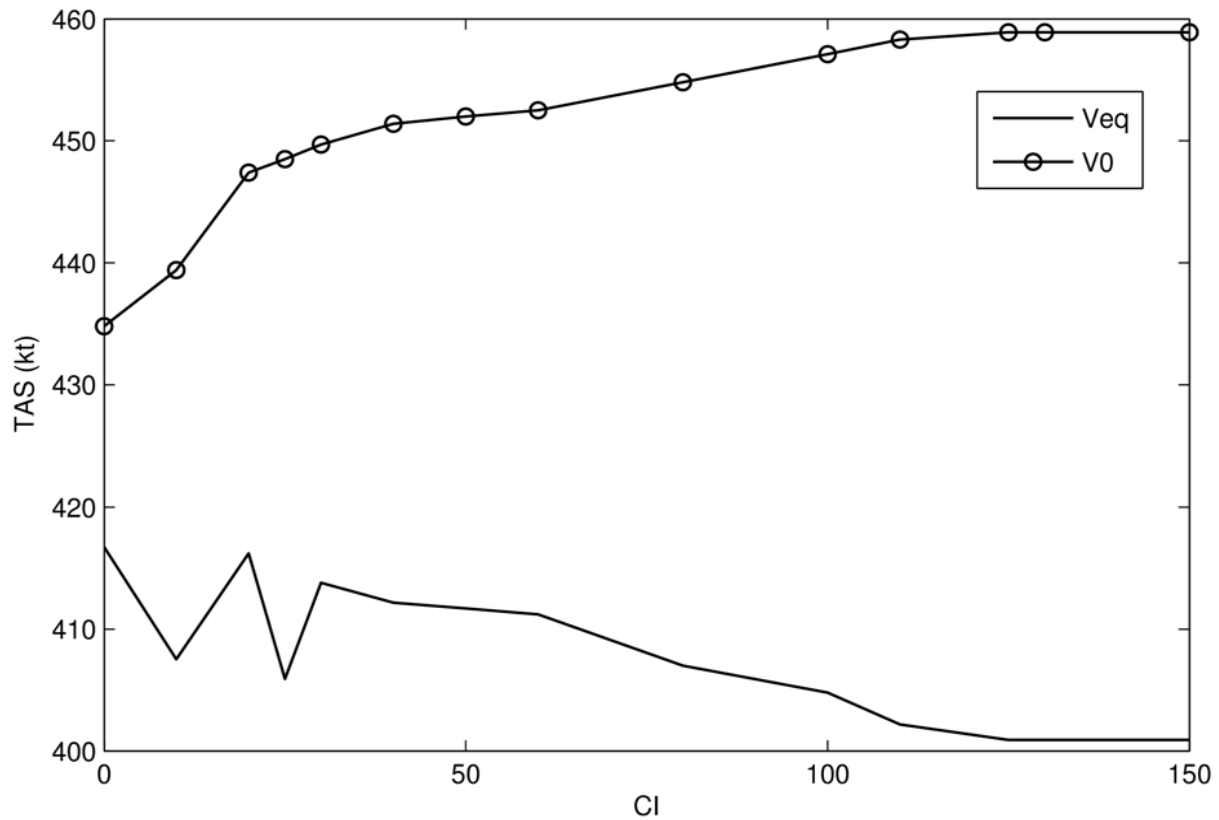
● ORY-NCE:

- A320
- CI 60
- FL 390
- V_0 0.79



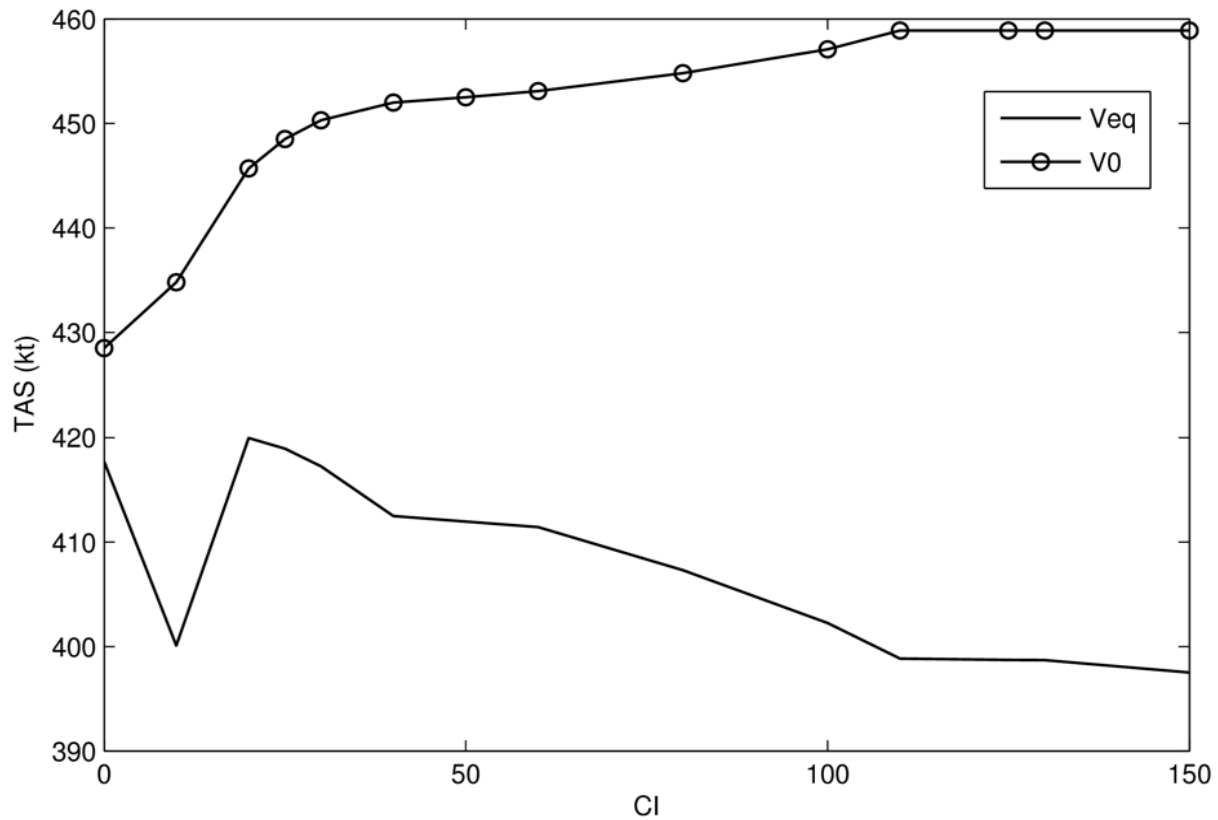
Application Examples

● FCO-CDG



Application Examples

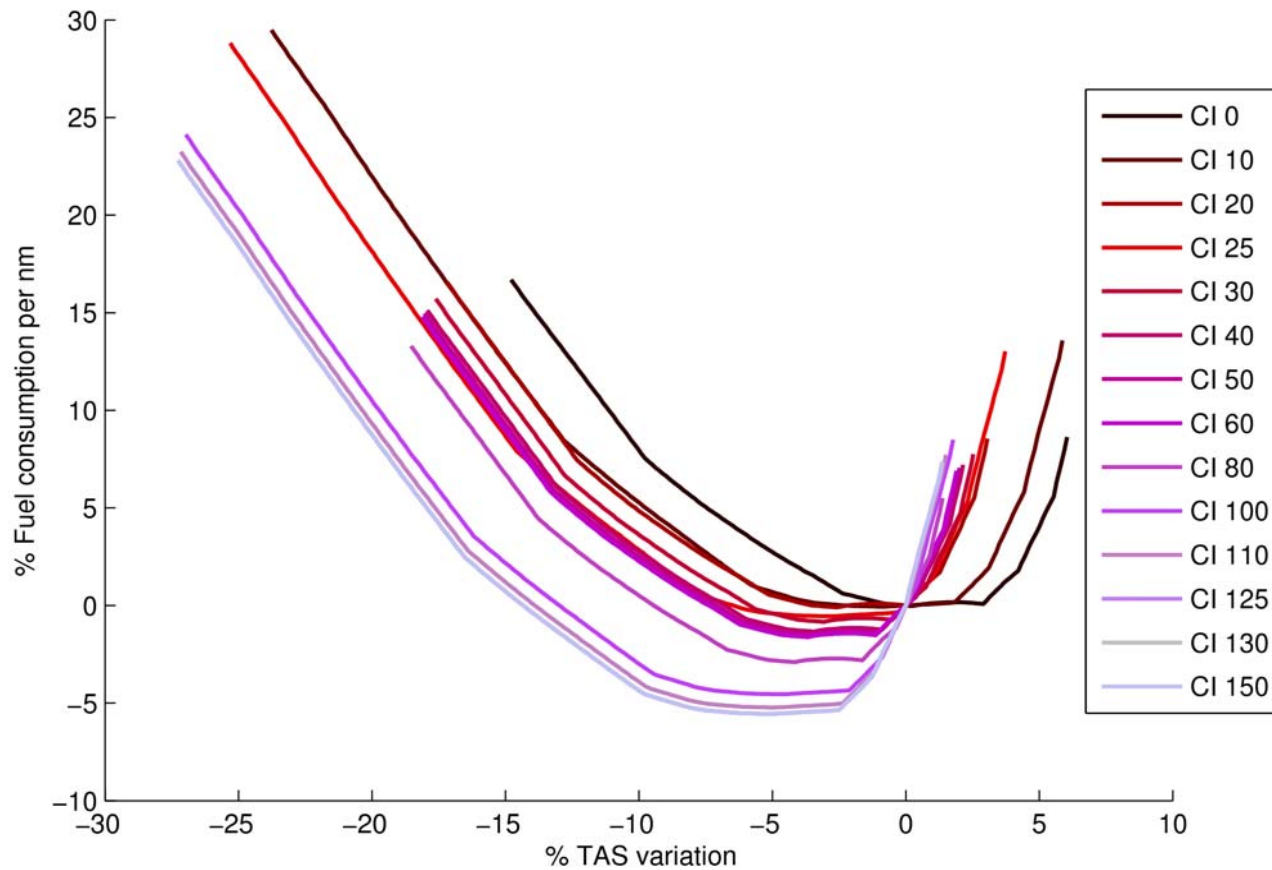
● ORY-NCE



Cost Index sensitivity



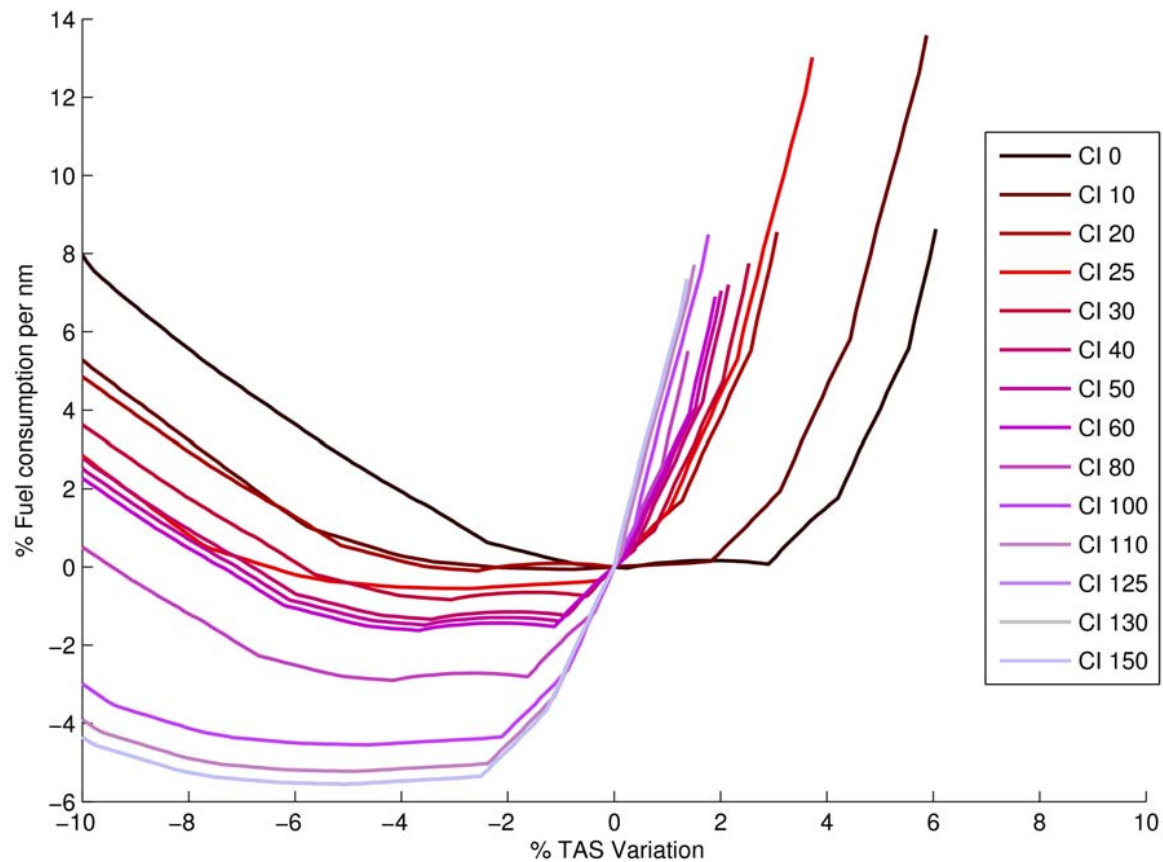
● FCO-CDG



Cost Index sensitivity

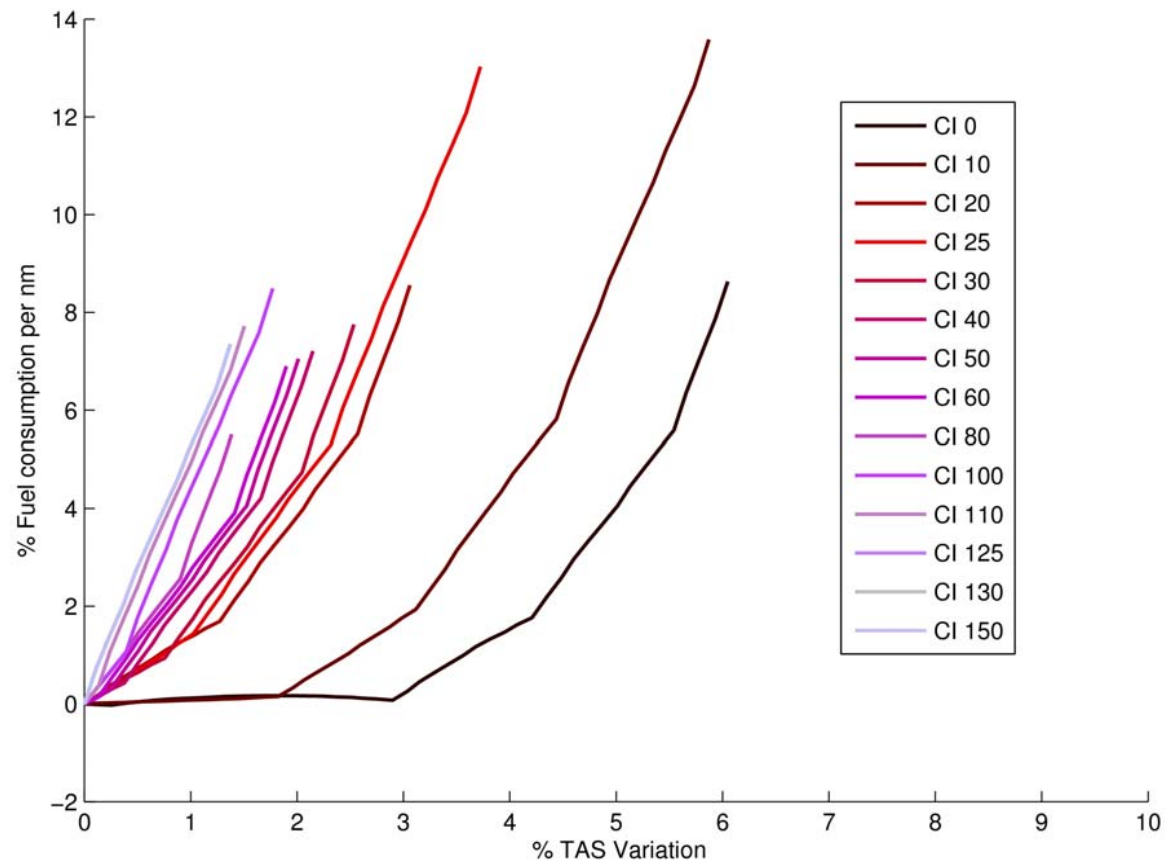


● FCO-CDG



Cost Index sensitivity

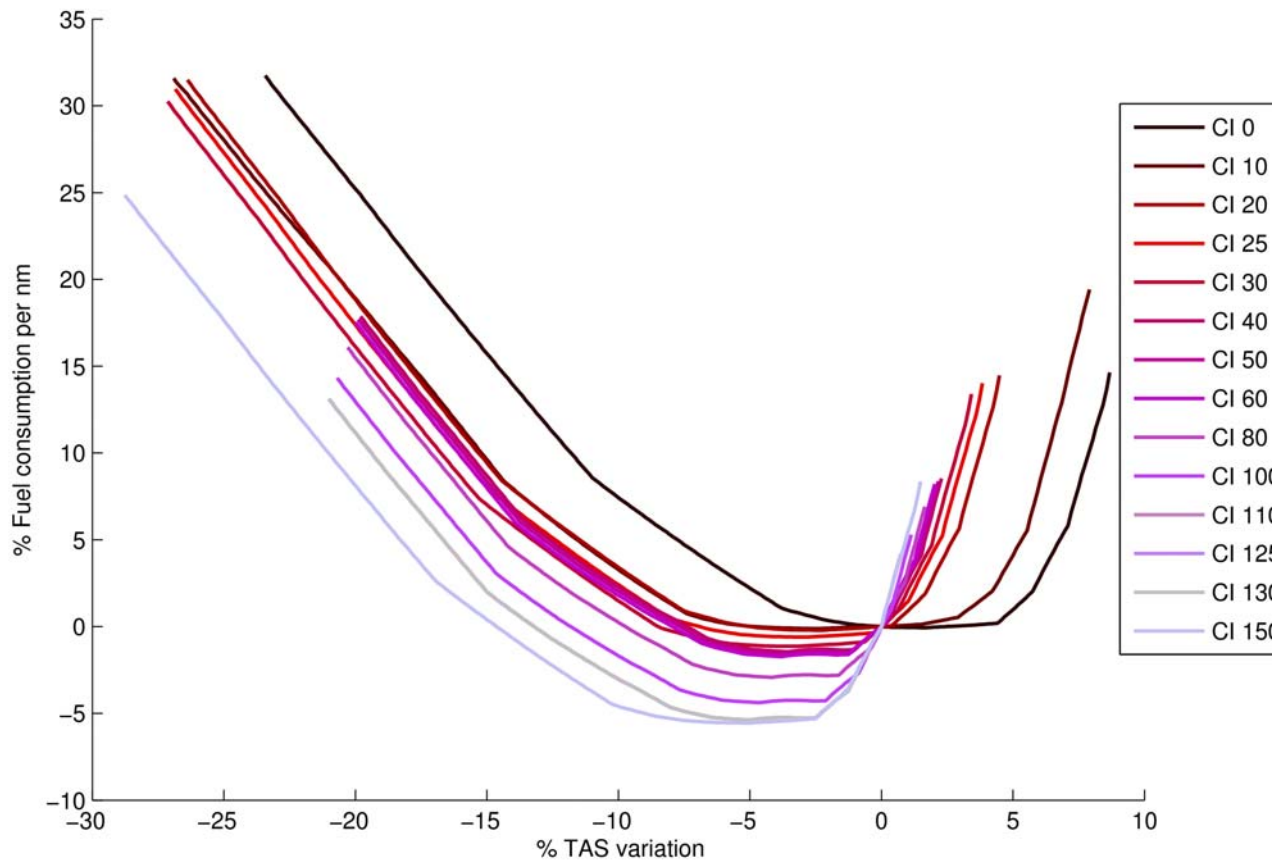
● FCO-CDG



Cost Index sensitivity

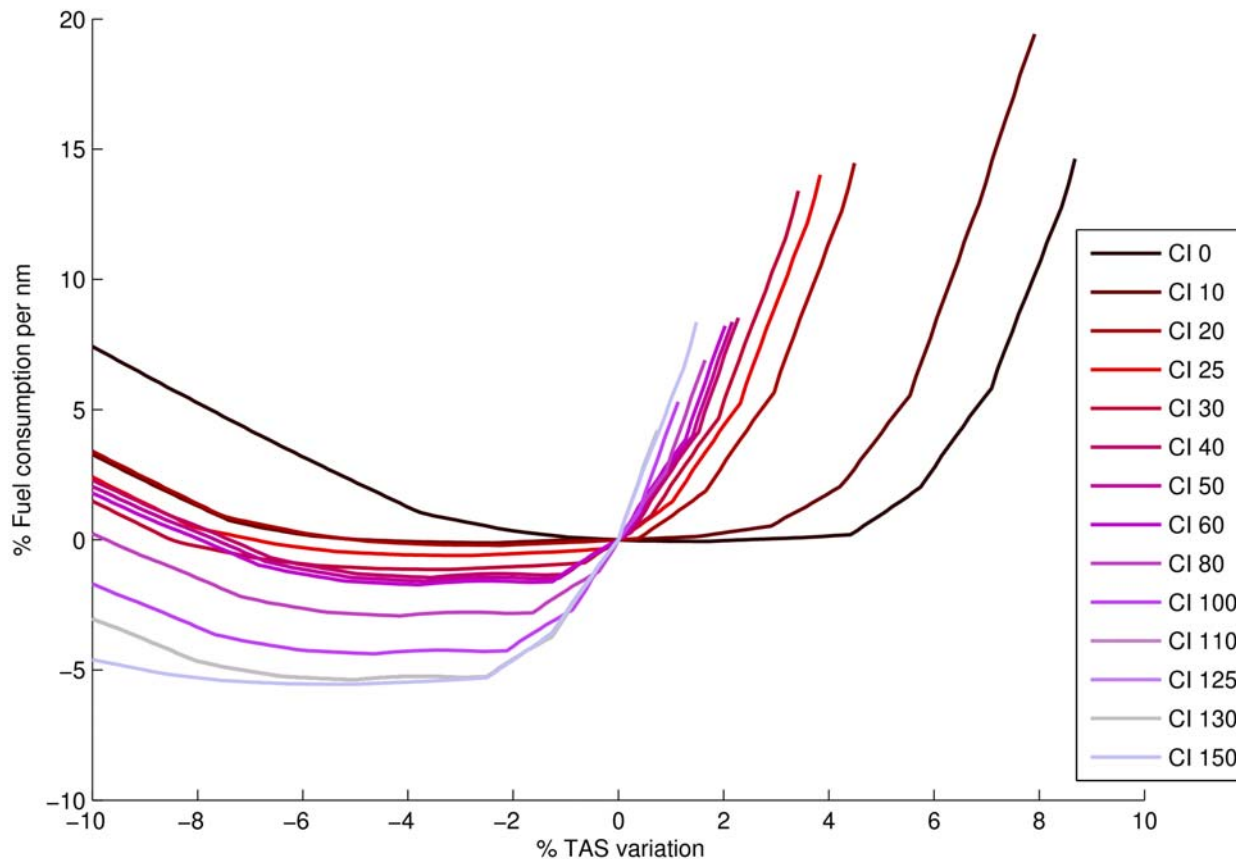


● ORY-NCE



Cost Index sensitivity

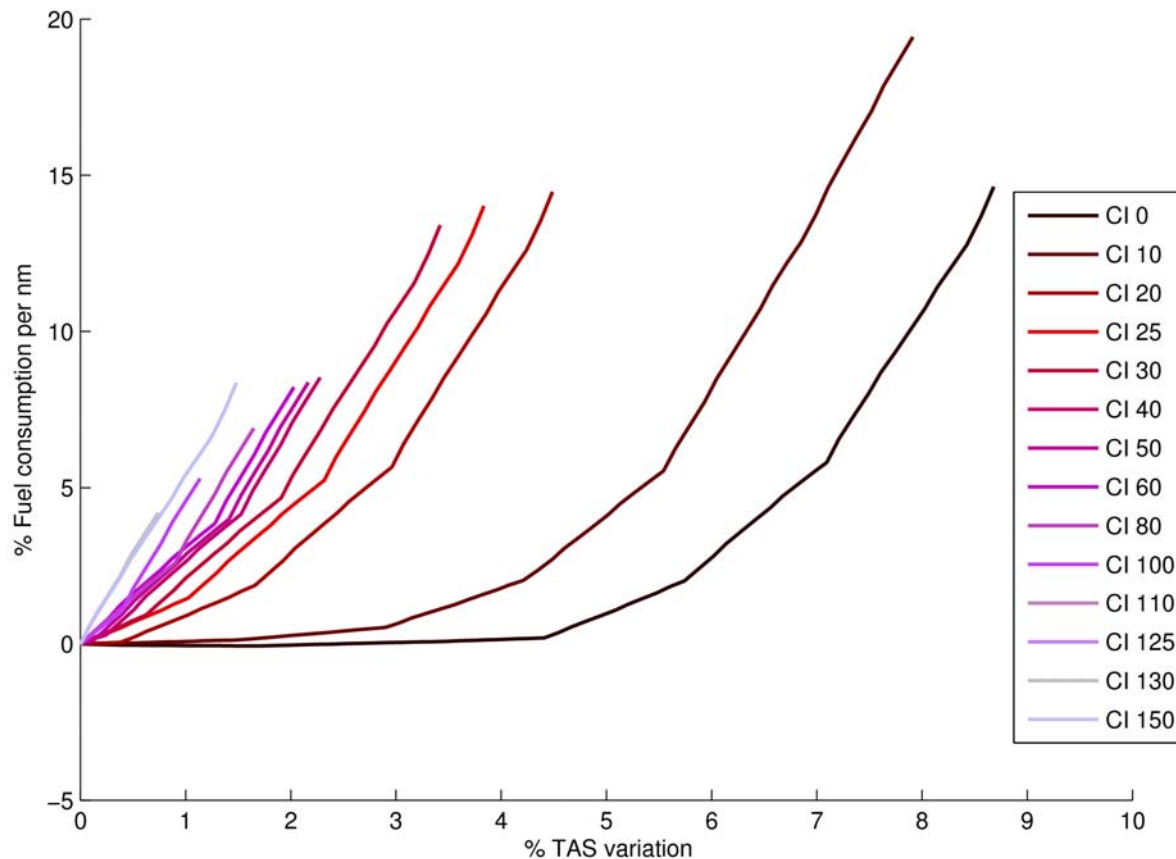
● ORY-NCE



Cost Index sensitivity



● ORY-NCE



Conclusions and Future Work



- Assessment analysis effects on cruise speed variations into fuel consumption:
 - Speeds variations have direct impact on fuel consumption
 - Increase of speed will increase fuel consumption
 - Reduction of speed may lead to save or expend more fuel
 - The desired CI have a big influence
 - For typical European region flight with typical CI, reductions up to 7% without negative impact on fuel consumption
 - Low values of CI reduce margin of reduction but minimize lost on increment
 - Difficult to arise general figure on fuel efficiency valid for all flights
 - Alternatives to speed variations have also extra cost. Therefore, speed variations may be competitive, from an economical point of view

Conclusions and Future Work

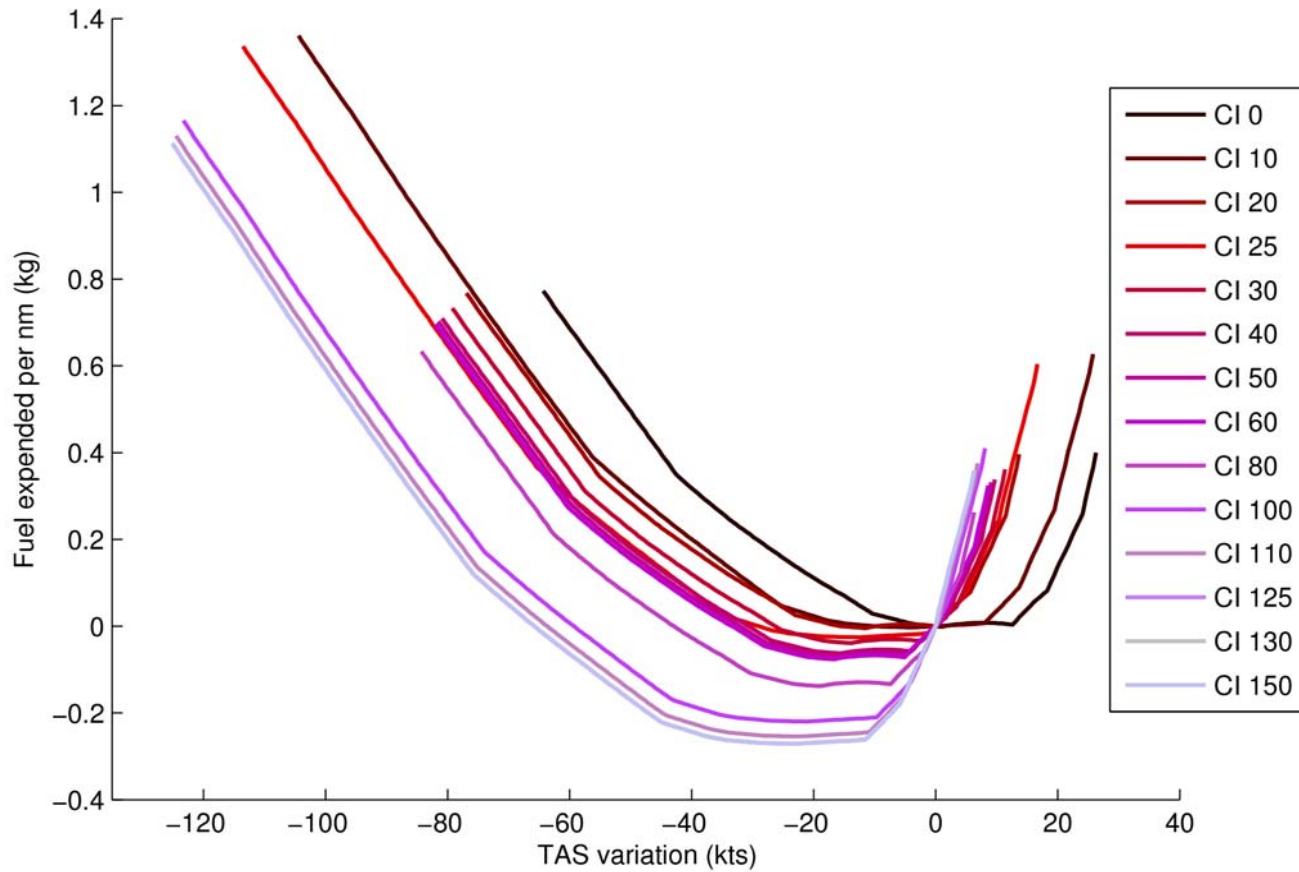
- Future work:
 - Comparison study between ATM solutions
 - Analysis of more flights and different aircraft

Thanks for your attention!

Cost Index sensitivity



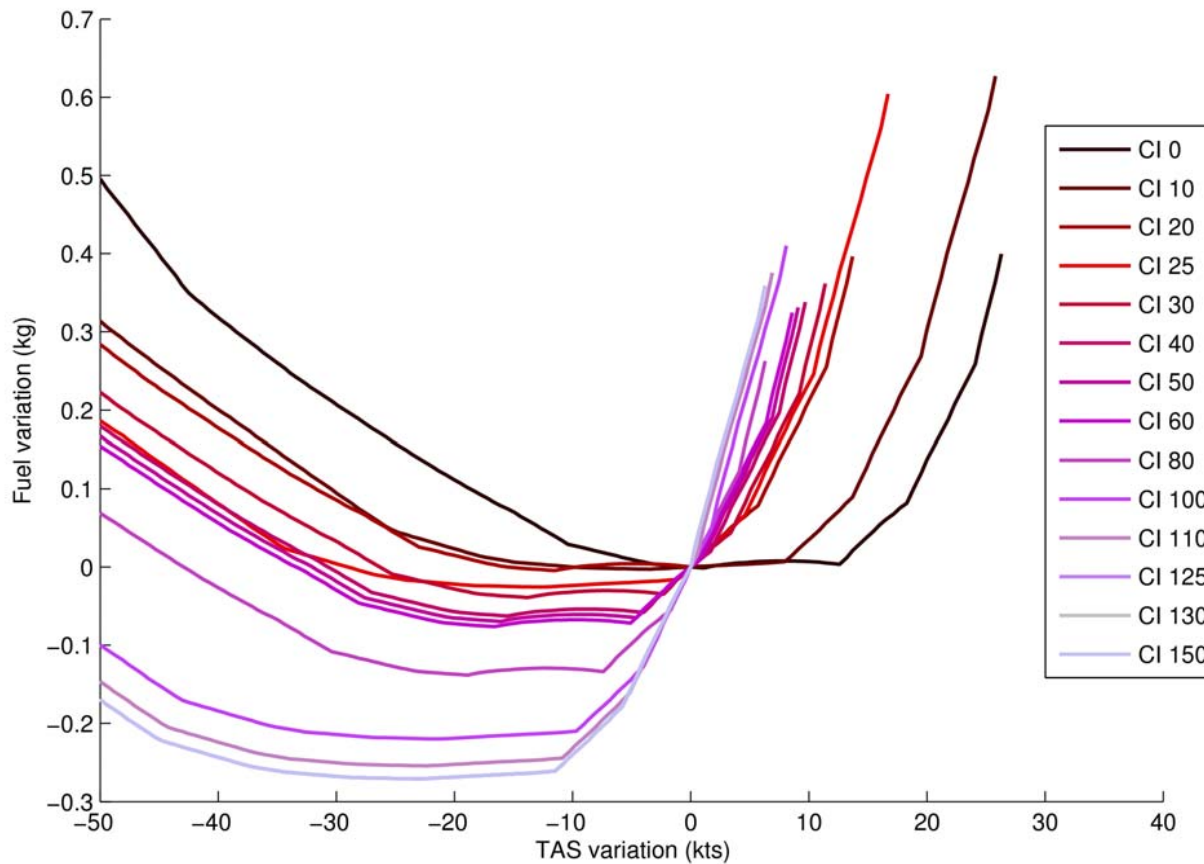
● FCO-CDG



Cost Index sensitivity



● FCO-CDG



Cost Index sensitivity



● ORY-NCE

