Perturbation theory emulator for galaxy 2-point statistics

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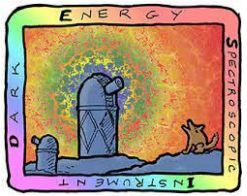
STEP'UP ÉCOLE DOCTORALE

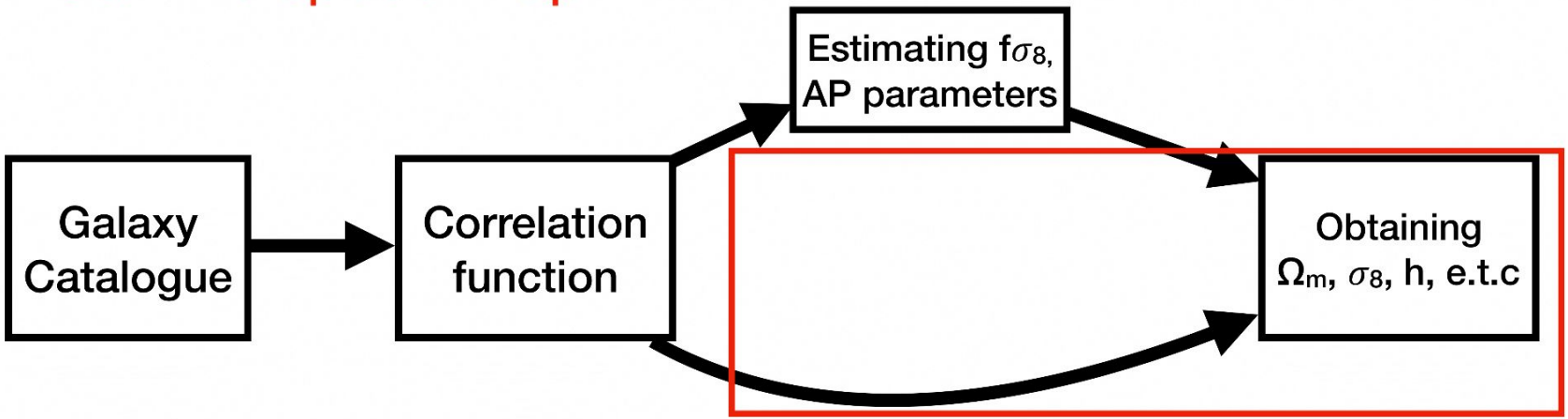


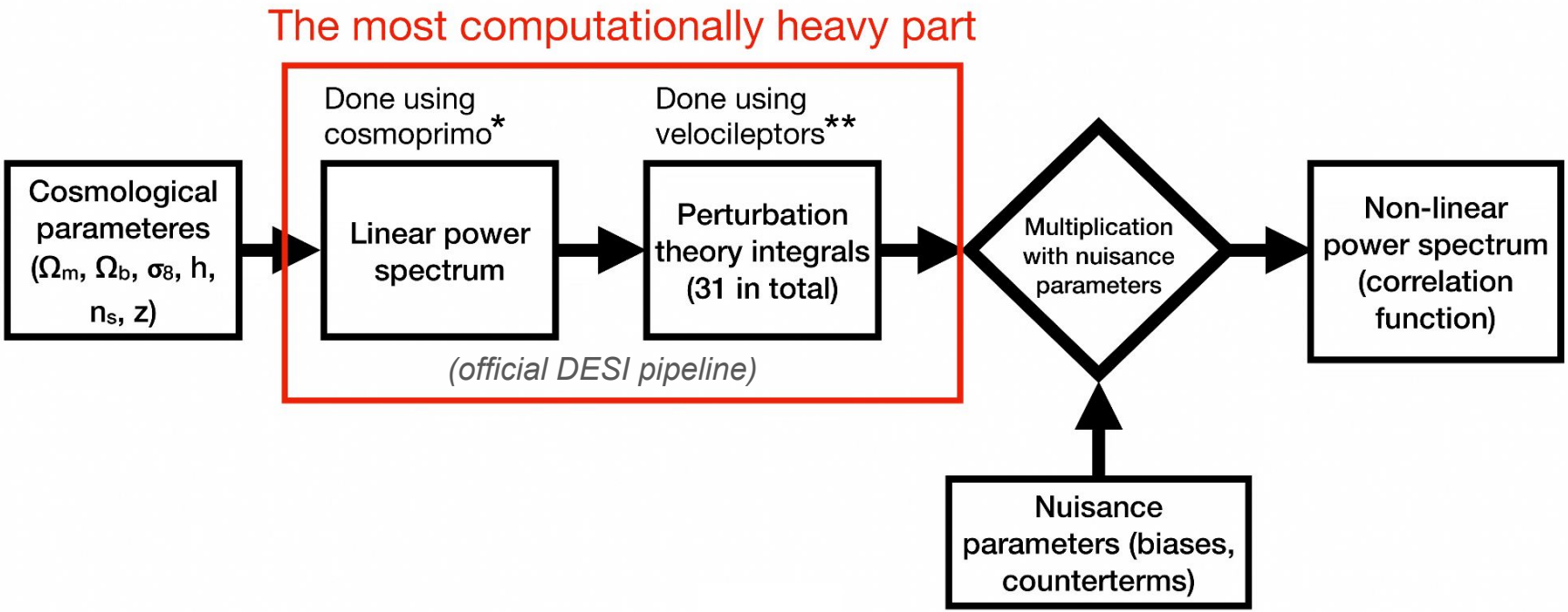
FONDATION CFM POUR LA RECHERCHE

Full modelling analysis

- Done in one step
- No additional compression beyond 2-point statistics
- Extremely slow computationally

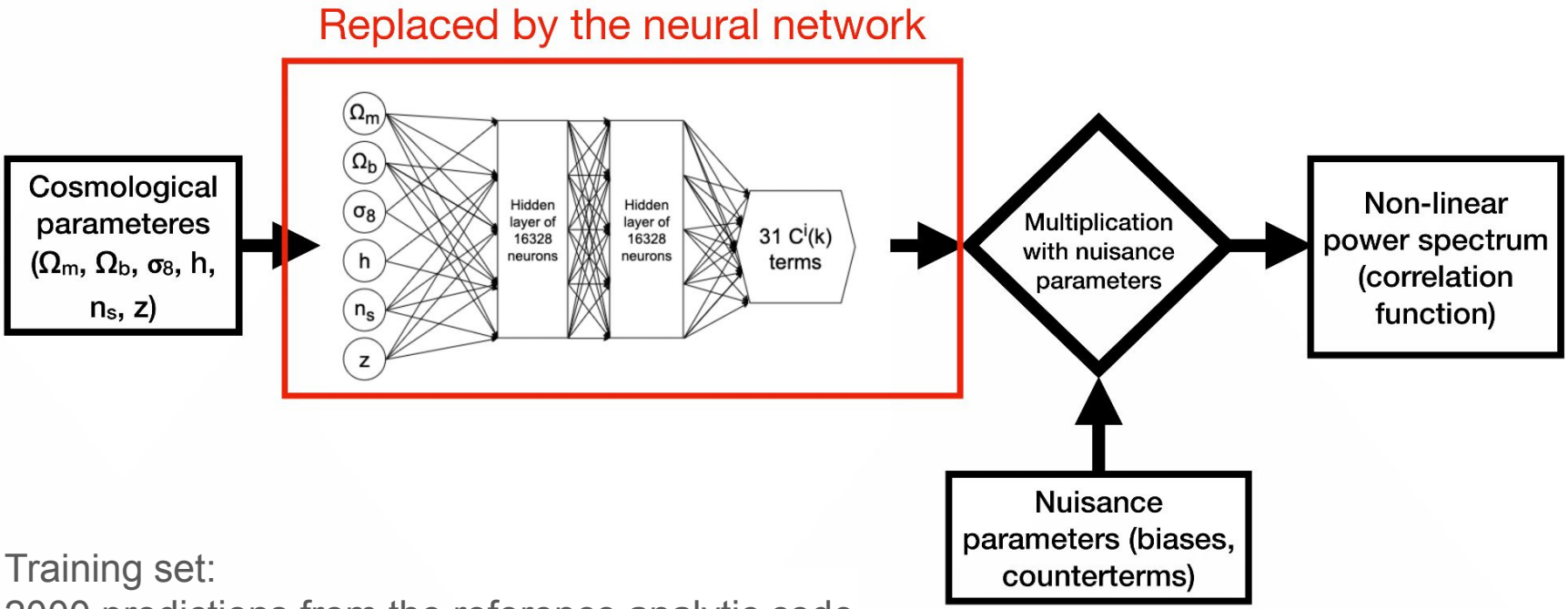
Can we speed it up?





* - https://github.com/cosmodesi/cosmoprimo

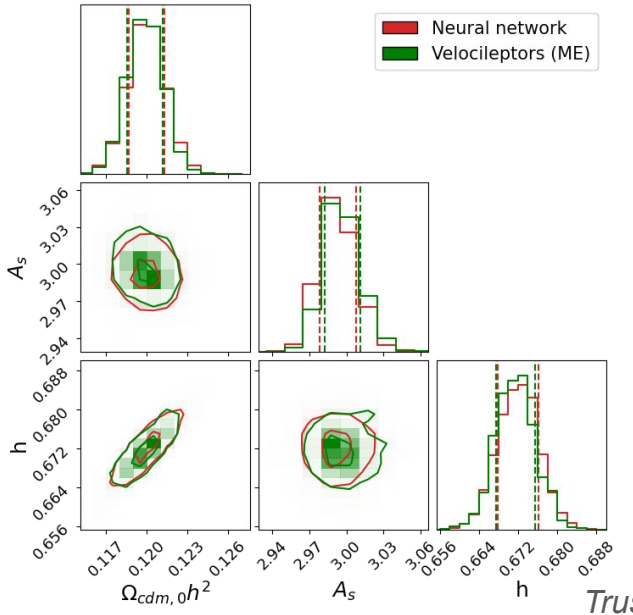
** - https://github.com/sfschen/velocileptors/ (Chen, Vlah & White (2020), Chen, Vlah, Castorina & White (2020))

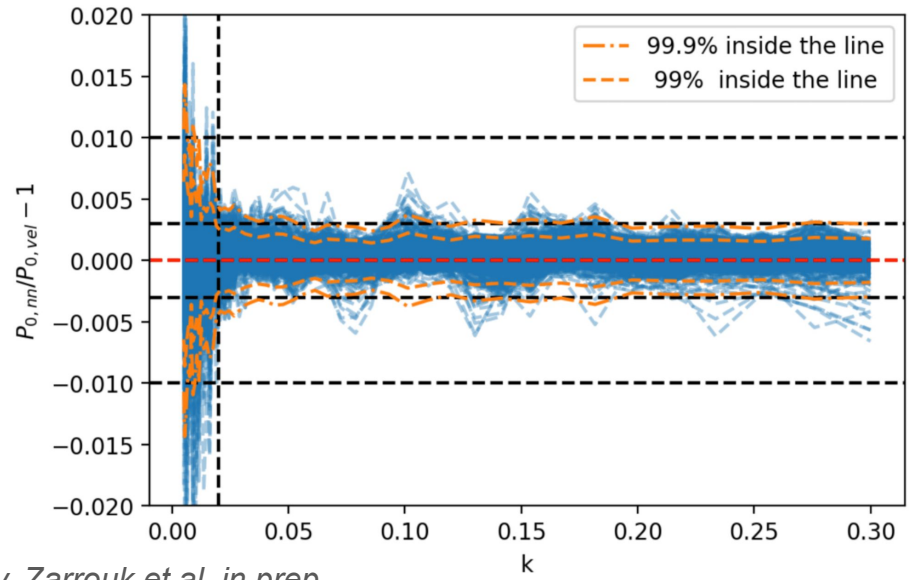


Training set:
2000 predictions from the reference analytic code (velocileptors)

(Chosen such that the approach can be extended to training from simulations)

1) The multipoles are predicted within 0.25% precision with respect to the reference analytic model (velocileptors)
2) The cosmological constraints are identical (both best-fit value and uncertainty) to those coming from the reference analytic model.
3) The execution is boosted by a factor of ~300 w.r.t brute force and by a factor of 10-15 w.r.t. interpolation as implemented into DESI pipeline.
4) Potential for going beyond Perturbation Theory





Trusov, Zarrouk et al. in prep

Thank you!