

README

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1 Which code

<https://github.com/YiQiGeng/EasyDistillation>

2 Baryon:How to use

2.1 set operators

2.1.1 set parity and momentum

$$Proton = Insertion(GammaName.B1, DerivativeName.IDEN, \\ ProjectionName.T1, momDict_mom1)$$

in which B1 means $\gamma_5\gamma_i\gamma_4$, IDEN means non derivative, T1 is match with B1, and *momDict_mom1* represents only zero momentum. For Proton,

$$Proton[1](0,0,0)$$

means zero momentum with $C\gamma_5$ which is $\gamma_4\gamma_2\gamma_5$, and finally is *gamma(5)* defined in Easy Distillation.

2.1.2 operator requirement

$$\begin{aligned}\mathcal{O}(P) &= \epsilon_{abc}P_{\pm}u_a(3)[u_b(1)^TC\gamma_5d_c(2)] \\ \mathcal{O}(P)^{\dagger} &= \epsilon_{abc}[\bar{u}_a(1)C\gamma_5\bar{d}_b(2)^T]\bar{u}_c(3)P_{\pm}\end{aligned}$$

we give u quark on the left hand of $C\gamma_5$ a order number 1, and the right d quark is 2 while the last u quark is 3 to marker them. Here, the three number will match three positions of perambulators in diagram, i.e. [1,2,3].

Why require this number order? Because the Dirac index of $C\gamma_5$ have fixed, i.e. between 1 and 2.

2.2 Load data

2.2.1 two ways difference

Use previous function *PerambulatorNpy* and *ElementalNpy*.

2.2.2 perambulators check

Please shift the second *tsink* index of peramb to $\delta t = t_{source} - t_{sink}$ with np.roll function.

2.3 Set diagram

- 1.Put antiquark on sink while quark on source by default, also put sink on the left which is 0 in diagram and source is 1.
- 2.After wick contraction, one can get three light propagators form source to sink, therefore there's a [1,2,3] in diagram.
- 3.Take care that *None* means propagators are straightly contracted while [1, 3] means quarks being contracted between the order number.

2.4 Calculation

compute_diagrams adds a new parameter named *parity*, of which it have p plus and p minus.

3 di_Baryon: How to use

1. Just give a 4×4 diagrams
2. Quark contraction list give six numbers, for example, quark 1 contract with 4 , quark 2 contract with 5 while quark 3 contract with 3, then one should give a list [1, 4, 2, 5, 3, 3].