

## Parameter setting of composite contact predictions in I-TASSER

### 1. For **easy** targets

1.1. For **template**-based contacts, include contacts with confidence score  $>0.1$

$cut_0=0.6$  for template-based contact, Ca atom and sidechain center

1.2. For **sequence**-based contacts, include contacts with confidence score  $>cut_0$  (corresponding to contact prediction accuracy  $\sim 0.3$ )

$cut_0=0.475$  for SVMSEQ, Ca atom contact,  $6\text{\AA}$

$cut_0=0.405$  for SVMSEQ, Ca atom contact,  $7\text{\AA}$

$cut_0=0.345$  for SVMSEQ, Ca atom contact,  $8\text{\AA}$

$cut_0=0.505$  for SVMSEQ, Cb atom contact,  $6\text{\AA}$

$cut_0=0.395$  for SVMSEQ, Cb atom contact,  $7\text{\AA}$

$cut_0=0.305$  for SVMSEQ, Cb atom contact,  $8\text{\AA}$

$cut_0=0.475$  for SVMSEQ, sidechain center contact,  $0.8cut(A,B)$

$cut_0=0.425$  for SVMSEQ, sidechain center contact,  $cut(A,B)$

$cut_0=0.345$  for SVMSEQ, sidechain center contact,  $1.2cut(A,B)$

1.3.  $w_1=0.4$ ,  $w_2=0.4$ ,  $w_k=1.5$  ( $k=1,\dots,9$ ) for eqn. 7 in SI.

### 2. For **medium** targets

2.1. For **template**-based contacts, include contacts with confidence score  $>0.1$

$cut_0=0.5$  for template-based contact, Ca atom and sidechain center

2.2 For **sequence**-based contacts, include contacts with confidence score  $>cut_0$  (corresponding to contact prediction accuracy  $\sim 0.4$ )

$cut_0=0.515$  for SVMSEQ, Ca atom contact,  $6\text{\AA}$

$cut_0=0.465$  for SVMSEQ, Ca atom contact,  $7\text{\AA}$

$cut_0=0.415$  for SVMSEQ, Ca atom contact,  $8\text{\AA}$

$cut_0=0.605$  for SVMSEQ, Cb atom contact,  $6\text{\AA}$

$cut_0=0.445$  for SVMSEQ, Cb atom contact,  $7\text{\AA}$

$cut_0=0.375$  for SVMSEQ, Cb atom contact,  $8\text{\AA}$

$cut_0=0.675$  for SVMSEQ, sidechain center contact,  $0.8cut(A,B)$

$cut_0=0.485$  for SVMSEQ, sidechain center contact,  $cut(A,B)$

$cut_0=0.435$  for SVMSEQ, sidechain center contact,  $1.2cut(A,B)$

2.3.  $w_1=1.08$ ,  $w_2=0.81$ ,  $w_k=2.5$  ( $k=1,\dots,9$ ) for eqn. 7 in SI

### 3. For **hard** targets

3.1. Select **template**-based contacts with confidence score  $>0.1$  and **sequence**-based contacts with confidence score  $>cut_0$  (corresponding to contact prediction accuracy  $\approx 0.425$ ).

$cut_0=0.556$  for SVMSEQ, Ca atom contact,  $6\text{\AA}$

$cut_0=0.555$  for SVMSEQ, Ca atom contact,  $7\text{\AA}$

$cut_0=0.567$  for SVMSEQ, Ca atom contact,  $8\text{\AA}$

$cut_0=0.473$  for SVMSEQ, Cb atom contact,  $6\text{\AA}$

$cut_0=0.440$  for SVMSEQ, Cb atom contact,  $7\text{\AA}$

$cut_0=0.441$  for SVMSEQ, Cb atom contact,  $8\text{\AA}$

$cut_0=0.486$  for SVMSEQ, sidechain center contact,  $0.8cut(A,B)$

$cut_0=0.486$  for SVMSEQ, sidechain center contact,  $cut(A,B)$

$cut_0=0.458$  for SVMSEQ, sidechain center contact,  $1.2cut(A,B)$

The final  $cut_0$  value for the combined score is  $0.4$ .

3.2.  $w_1=2.7$ ,  $w_2=0.765$  for eqn. 2 in SI

$w_1=0.6$  (template-based),  $w_k=0.1$  ( $k=2,\dots,10$ , sequence-based) for eqn. 6 in SI