**Instruction of PDC package**

This package includes Matlab scripts and several datasets for demo of PDC approach:

1. main\_PDC.m is a Matlab function for the routine of experimental analysis.

**(b)**  main\_PDC.m is the main script to call PDC by supplying following parameters:

(1) **expression\_tumor\_fileName**: the directory locating of the gene expression data as the input data.

(2) **expression\_normal\_fileName**: the directory locating of the copy number variations data as the input data.

**(c)** Algorithm\_PDC directory includes Matlab scripts for each step of PDC analysis, and called in main\_PDC.m

(d) The input datasets include:

(1) **tumor.txt:** the tumor expression data in cancer.

(2) **normal.txt:** the normal expression data in cancer.

(3) **Network\_index**:denotes which network PDC will use.

%if Network\_index =1,PDC uses synthetic lethality genes interactions dataset (SynLethDB) collected from a variety of sources(*Guo, J., Liu, H. and Zheng, J. (2016) SynLethDB: synthetic lethality database toward discovery of selective and sensitive anticancer drug targets, Nucleic Acids Research, 44, D1011-D1017.*).

%if Network\_index=2,PDC uses the reference GeneInteractionNetwork (GIN) (*Hou, J.P. and Ma, J. (2014) DawnRank: discovering personalized driver genes in cancer, Genome medicine, 6, 56.*) collected with literature retrieval or theoretical pre-diction.

%if Network\_index=3,PDC uses the human signal PPI network (sPPI) constructed by Vinayagam A, et al.(*Vinayagam, A., Stelzl, U., Foulle, R., Plassmann, S., Zenkner, M., Timm, J., ... & Wanker, E. E. (2011). A directed protein interaction network for investigating intracellular signal transduction. Sci. Signal., 4(189), rs8-rs8.*).

(4) **Control\_method\_index**:denotes which control method PDC will use.

%if Control\_method\_index =1,PDC uses our iNCUA control method.

%if Network\_index=2,PDC uses the Minimum Dominating Sets based control method(*Nacher, J.C. and Akutsu, T. (2012) Dominating scale-free networks with variable scaling exponent: heterogeneous networks are not difficult to control, New Journal of Physics,* ***14****, 73005-73028(73024).*）.

%if Network\_index=3,PDC uses the Linear control theory based control method(*Liu, Y.-Y., Slotine, J.-J. and Barabási, A.-L. (2011) Controllability of complex networks, Nature,* ***473****, 167;Yuan, Z., Zhao, C., Di, Z., Wang, W. X., & Lai, Y. C. (2013). Exact controllability of complex networks. Nature communications, 4, 2447.*).

%if Control\_method\_index=4,PDC uses minimum FVS based method

%Chakradhar, S.T., A. Balakrishnan, and V.D. Agrawal, An exact algorithm for selecting partial scan flip-flops. Journal of Electronic Testing, 1995. 7(1-2): p. 83-93.

**Note: Our PDC outputs the information of samples with paired data in the both two files.**

(e) The variable “**Result\_predict\_drug**” and“**NC\_genes**” is the output of our PDC, indicting the predicted individual combinational drugs and the target genes. For “**Result\_predict\_drug**”,the first column is the sample name with paired data (normal and tumor) and the second column is the ranked combinational drug name in descend with defined scores. For “**NC\_genes**”,the first column is the sample name with paired data (normal and tumor) and the second column is the epistasis control genes within the breast cancer genes.

(f) As a demo, users can directly run main\_PDC.m in Matlab. **We choose the BRCA cancer data as a test case in our demo.** We have test my PDC code in “Demo\_main\_test\_BRCA.m”. This package has been tested in different computer environments as: Window 7 or above; **Matlab 2014** or above.

(g) When users analyzed yourself new data, please:

(1) Prepare input datasets as introduced in (d).

(2) Clear the previous results.

(3) Set parameters in main\_PDC.m as introduced in (b).

(4) Run main\_PDC.m.

(5) Suggest that the users add all fille in our folders to your folder.

% $Id: main\_PDC.m Created by Weifeng Guo, Northwestern Polytechtical University, China at 2018-08-22 16:25:22 $

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% $If any problem,pleasse contact **shaonianweifeng@126.com** for help. $