CBGP
CENTRO DE BIOTECNOLOGÍA Y GENÓMICA DE PLANTAS
UPM-INIA/CSIC

EXCELENCIA SEVERO OCHOA

Investigación de excelencia en biotecnología y genómica de plantas

POLITÉCNICA

INIA
Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria

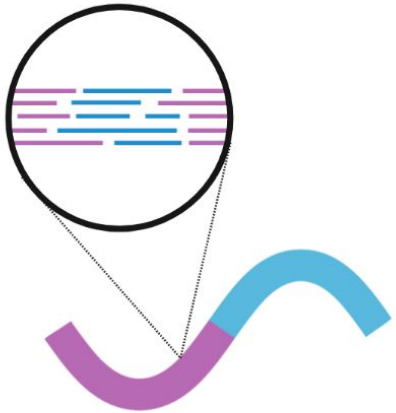
CSIC

Modeling Circadian rhythm in tomato

Alberto González Delgado

Laboratory
PlantDynamics

Data set



Conditions:

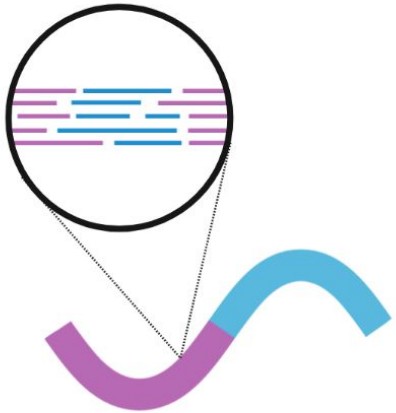
- Long Day (LD): 16 h light / 8 h dark
- Short Day (SD): 8 h light / 16 h dark
- Neutral Day(ND): 12 h light / 12 h dark

Genotypes:

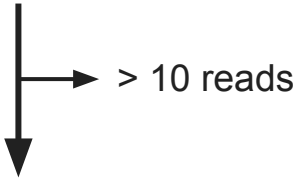
- MoneyMaker: MM
- EID1: MM with an introgression wild allele of EID1
- LNK2: MM with an introgression wild allele of LNK2
- LE: MM with wild allele of EID1 and LNK2

Xiang et al., 2022

Data set



- Alignment (hisat2): maximum intron length (115400 bp)
- Annotation (Rsubread.FeatureCounts): default parameters



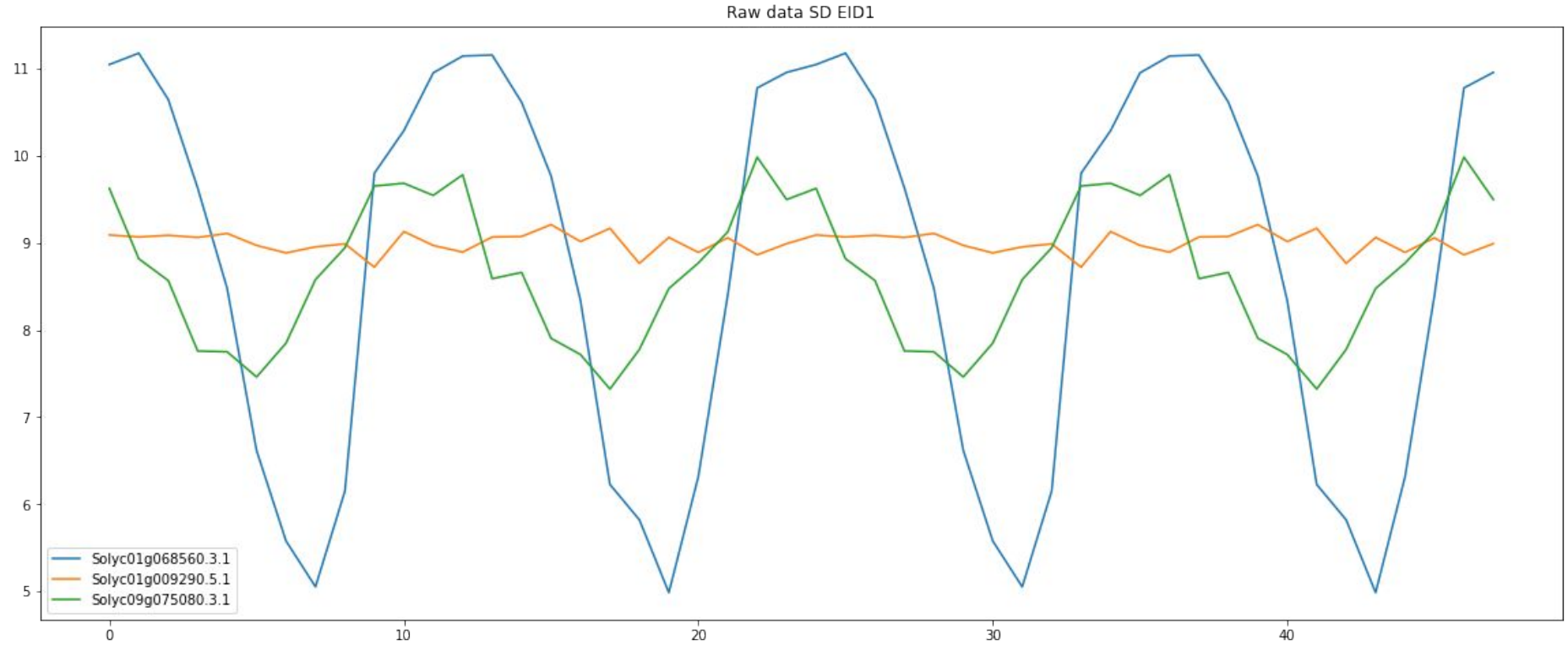
- Dataset (DEseq2.vst) → normalized values per sample

Xiang et al., 2022

Data set

gene_id	chr	start	end	strand	length	exons	LD_EID1_CT01_r1	LD_EID1_CT01_r2	LD_EID1_CT03_r1	LD_EID1_CT03_r2	LD_EID1_CT05_r1	LD_EID1_CT05_r2	LD_EID1_CT07_r1	LD_EID1_
Solyc00g500003.1.1	SL4.0ch00	311496	311570	-	1665	6	2.424715109	2.424715109	2.424715109	2.424715109	2.424715109	2.424715109	2.424715109	3.1(
Solyc00g500019.1.1	SL4.0ch00	1E+06	1E+06	+	372	2	5.060650476	5.578580742	5.296374776	5.552649453	5.206410974	5.562202902	5.537920417	5.55
Solyc00g500020.1.1	SL4.0ch00	1E+06	1E+06	+	1305	2	6.987420087	7.097339333	7.084133397	7.381125278	7.223153544	6.647578119	7.638750176	6.7
Solyc00g500021.1.1	SL4.0ch00	1E+06	1E+06	-	324	2	8.775235068	9.049186184	9.074913251	8.892628496	8.93058697	8.821860605	9.147210009	8.82
Solyc00g500022.1.1	SL4.0ch00	1E+06	1E+06	+	810	1	7.222100466	7.981161881	7.294797938	7.669208482	7.558807619	6.856284361	7.555376001	7.48
Solyc00g180440.2.1	SL4.0ch00	1E+06	1E+06	-	387	1	4.724270554	5.148773349	5.021766904	3.77756862	5.452382791	4.789604038	5.493224694	4.93
Solyc00g500023.1.1	SL4.0ch00	1E+06	1E+06	-	1023	3	6.948665066	7.308146217	7.232216276	7.062365359	7.183507387	6.731478198	7.678694897	7.04
Solyc00g500024.1.1	SL4.0ch00	1E+06	1E+06	+	1527	1	7.47920631	7.513399181	7.698085499	7.507390502	7.286895703	6.318829903	7.773964664	7.67
Solyc00g500025.1.1	SL4.0ch00	1E+06	1E+06	-	195	2	4.271814466	4.217380331	4.209506029	3.60640946	4.219434708	3.741180971	4.723592192	4.87
Solyc00g500026.1.1	SL4.0ch00	1E+06	1E+06	+	207	2	3.340685253	4.097894091	4.510224364	4.05487612	2.424715109	2.424715109	4.358638328	4.52
Solyc00g500028.1.1	SL4.0ch00	1E+06	1E+06	+	450	2	4.658984925	5.805926474	5.021766904	5.031493064	4.972307564	4.231363129	5.132434057	5.1
Solyc00g500029.1.1	SL4.0ch00	1E+06	1E+06	-	273	2	4.845956026	4.519077454	5.081245983	4.972699809	4.689282013	4.327660969	5.009337036	4.93
Solyc00g500030.1.1	SL4.0ch00	1E+06	1E+06	-	417	1	4.271814466	5.203636445	5.567188596	3.77756862	4.428522063	4.500590174	4.874020187	5.25
Solyc00g500031.1.1	SL4.0ch00	1E+06	1E+06	-	771	2	5.556222243	5.907221514	5.021766904	5.86993848	4.972307564	5.229236238	5.072266716	5.2(
Solyc00g500032.1.1	SL4.0ch00	1E+06	1E+06	-	357	1	4.902898207	5.536851427	5.021766904	5.142005618	4.328347087	4.579029291	5.399314866	4.87
Solyc00g500033.1.1	SL4.0ch00	1E+06	1E+06	+	507	5	5.060650476	5.840501788	5.685225992	5.86993848	5.034686775	5.405618961	5.493224694	5.2(
Solyc00g500034.1.1	SL4.0ch00	1E+06	1E+06	-	1059	2	6.796889112	6.979090923	6.517985391	6.278828118	6.401725577	5.891113208	6.470679958	6.41
Solyc00g500035.1.1	SL4.0ch00	1E+06	1E+06	-	429	1	4.590295501	4.605648003	4.417723155	4.376806358	4.765834893	4.971467523	5.072266716	4.6(
Solyc00g500036.1.1	SL4.0ch00	1E+06	1E+06	-	402	1	4.177728126	5.97094603	5.245647828	5.552649453	5.581549835	5.524665188	4.943364271	5.1(
Solyc00g500037.1.1	SL4.0ch00	1E+06	1E+06	+	6624	2	4.359237757	4.326197204	3.957999891	4.632806143	3.426830663	4.327660969	3.839535885	3.9(
Solyc00g500038.1.1	SL4.0ch00	1E+06	1E+06	+	216	2	4.845956026	6.118785817	6.161575264	5.961652982	6.149794271	5.181401297	6.166700552	5.7
Solyc00g500039.1.1	SL4.0ch00	1E+06	1E+06	-	501	3	11.45718612	11.39886314	11.33790126	11.41658171	10.93085559	9.921620478	11.90134151	12.1
Solyc00g500040.1.1	SL4.0ch00	1E+06	1E+06	+	567	2	4.517791315	4.326197204	4.417723155	3.60640946	3.640571292	3.574134304	3.992409472	3.9(
Solyc00g160280.1.1	SL4.0ch00	1E+06	1E+06	-	1665	2	5.624084012	5.734134953	5.567188596	5.737626526	5.496772795	4.723065254	5.92082911	6.08
Solyc00g500041.1.1	SL4.0ch00	1E+06	1E+06	-	1092	2	5.810036751	6.551600681	5.958919139	5.771881608	6.149794271	5.080447286	6.470679958	6.1(
Solyc00g500042.2.1	SL4.0ch00	1E+06	1E+06	-	3100	1	6.377255204	6.850236027	6.1065546	6.370615281	6.177083581	5.768571295	6.622134042	5.62
Solyc00g500043.1.1	SL4.0ch00	1E+06	1E+06	-	1848	2	4.271814466	4.605648003	4.510224364	5.142005618	4.521386615	4.327660969	4.459992172	5.34
Solyc00g500044.1.1	SL4.0ch00	1E+06	1E+06	+	501	3	11.56661823	11.36836672	11.44582067	11.43058246	11.00181685	10.0296905	12.02310381	12.2
Solyc00g500045.1.1	SL4.0ch00	1E+06	1E+06	-	216	2	6.18999016	6.866989139	6.45345498	6.302333253	6.886945758	6.252078517	6.795959211	6.82
Solyc00g500046.1.1	SL4.0ch00	1E+06	1E+06	-	6624	2	5.838784071	6.061478451	5.828670397	5.194101764	5.539800764	5.027043583	5.92082911	5.3(
Solyc00g500047.1.1	SL4.0ch00	1E+06	1E+06	+	885	3	7.012688214	7.368156934	7.294797938	7.048575132	7.864625783	7.09018915	7.628588509	7.23
Solyc00g277510.2.1	SL4.0ch00	1E+06	1E+06	-	1062	1	8.319654561	9.165252757	8.44648573	8.612812624	8.635192081	7.291319208	9.233498219	9.71
Solyc00g500048.1.1	SL4.0ch00	1E+06	1E+06	-	1356	2	7.63363213	7.596004597	7.622061988	7.651087908	7.668120064	7.668057198	7.746039264	7.5(
Solyc00g500049.1.1	SL4.0ch00	1E+06	1E+06	+	294	2	7.037519907	7.565580025	7.366472165	7.168170893	7.61945829	6.998436191	7.511806443	7.5
Solyc00g500050.1.1	SL4.0ch00	1E+06	1E+06	-	1524	1	8.932210182	9.836646108	9.151229847	9.370463218	9.788477245	8.572394123	9.863940209	9.48
Solyc00g500051.1.1	SL4.0ch00	1E+06	1E+06	-	1101	5	5.921686673	6.09042022	6.1065546	5.591638657	6.447192208	5.181401297	6.194653125	5.98
Solyc00g500052.1.1	SL4.0ch00	1E+06	1E+06	-	4974	6	5.556222243	5.69682446	5.895288288	5.771881608	5.737173773	4.852989382	5.623260894	5.2(
Solyc00g500053.2.1	SL4.0ch00	1E+06	1E+06	-	699	1	3.840001479	4.217380331	3.957999891	3.398190229	3.816036972	3.574134304	4.248388469	3.58

Gene Expression. Raw data



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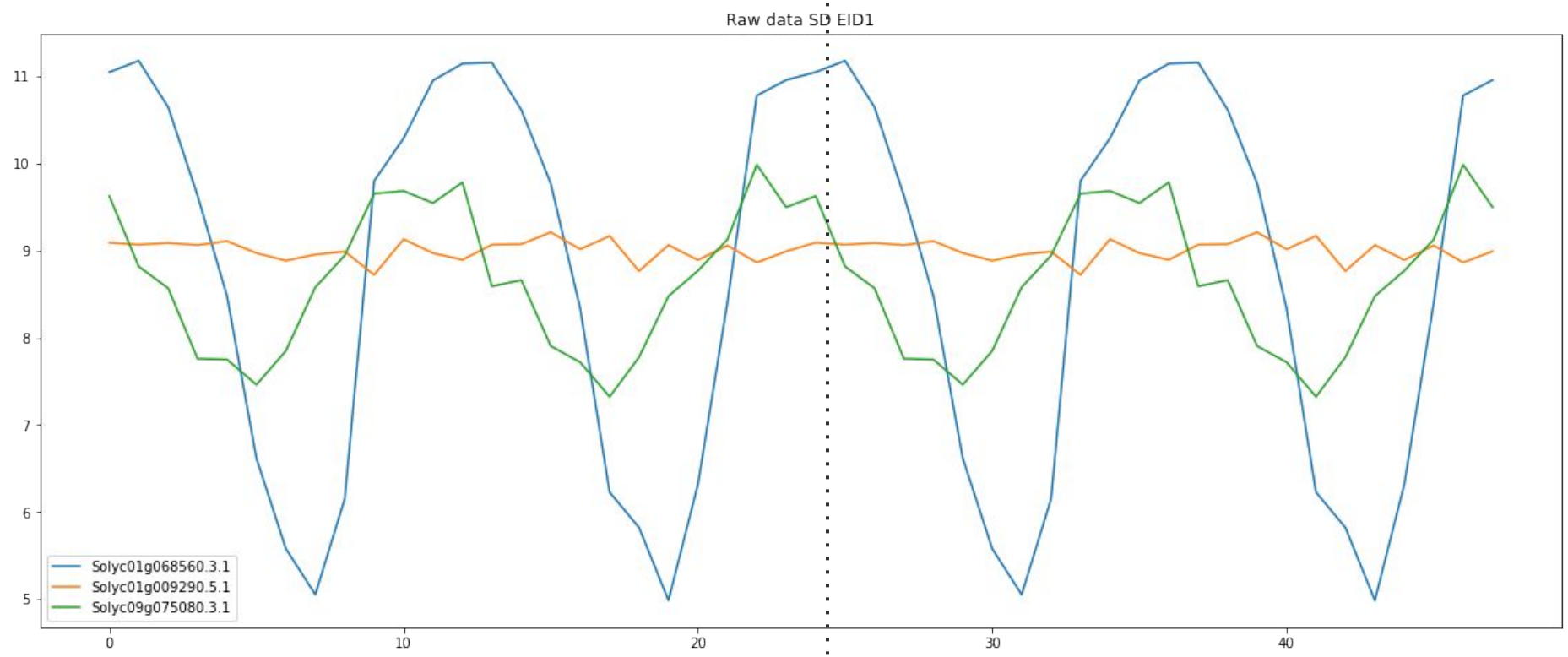
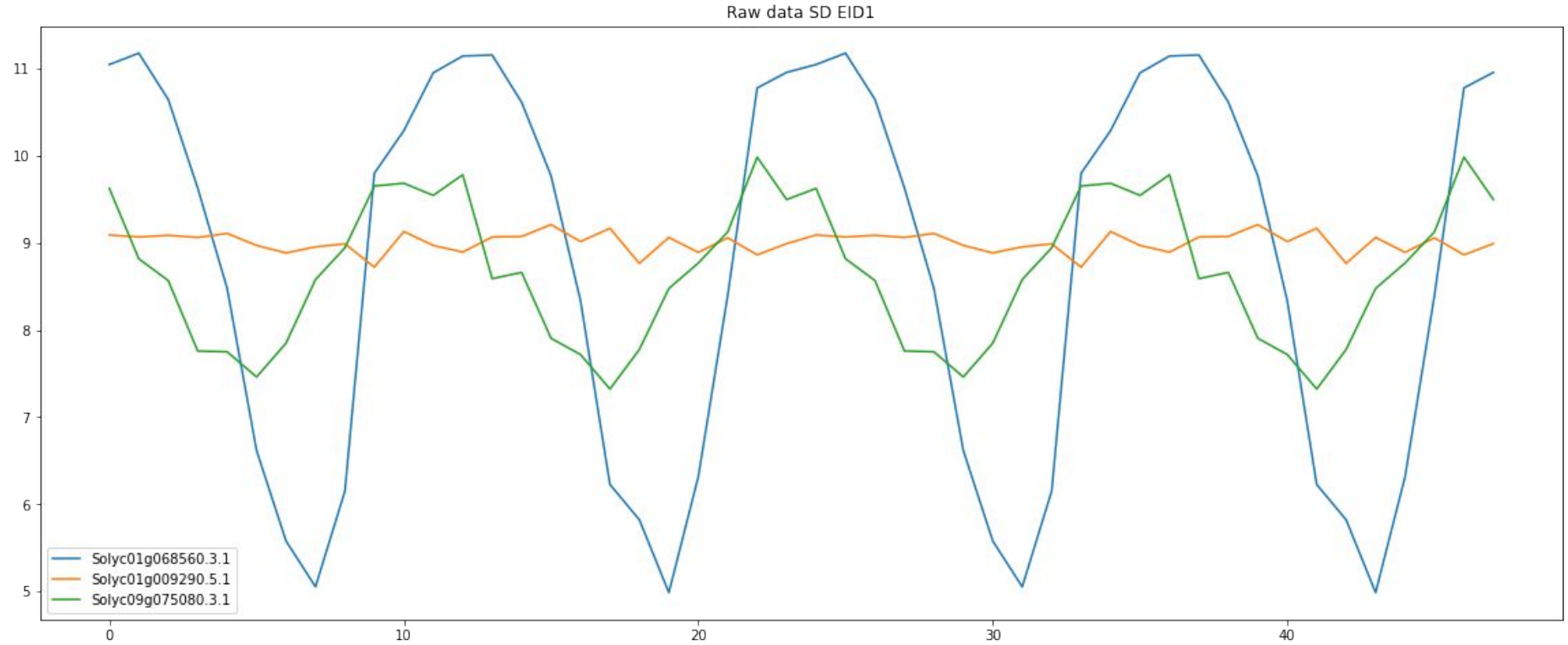
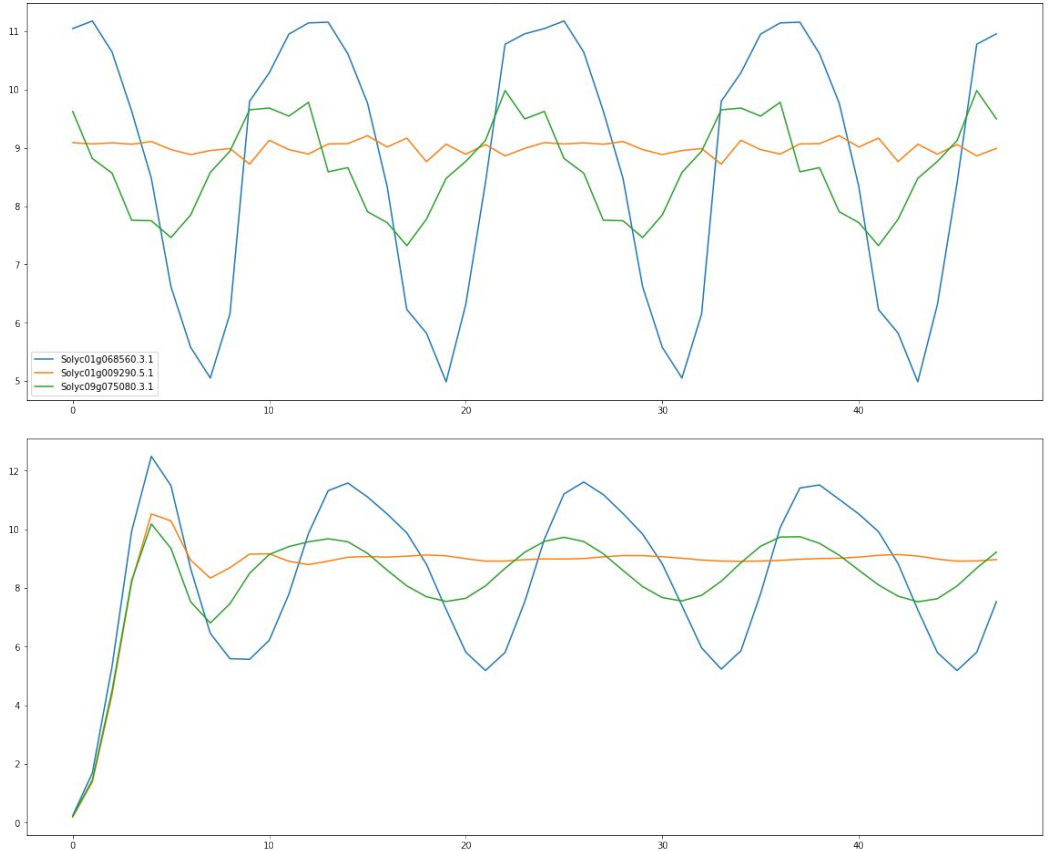


Gene Expression. Raw data

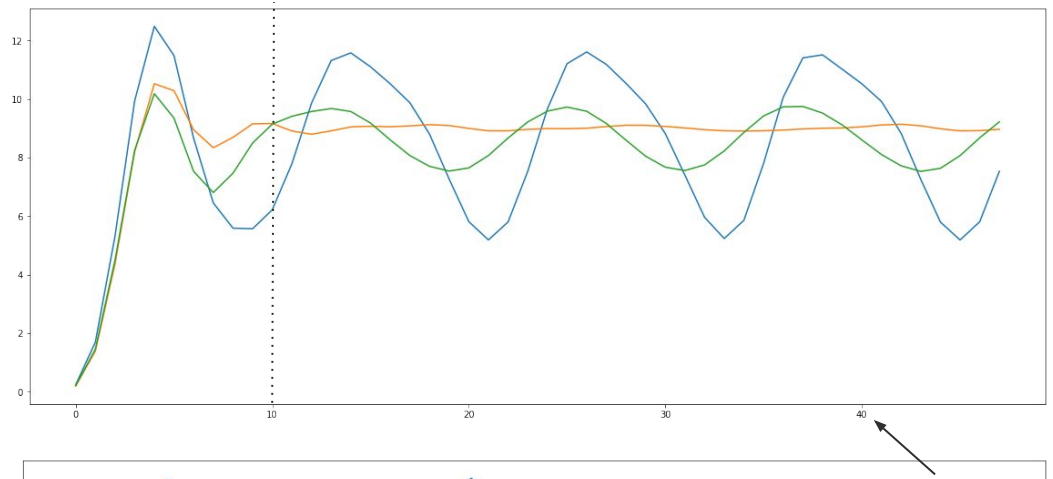


Gene Expression. Filtering noise

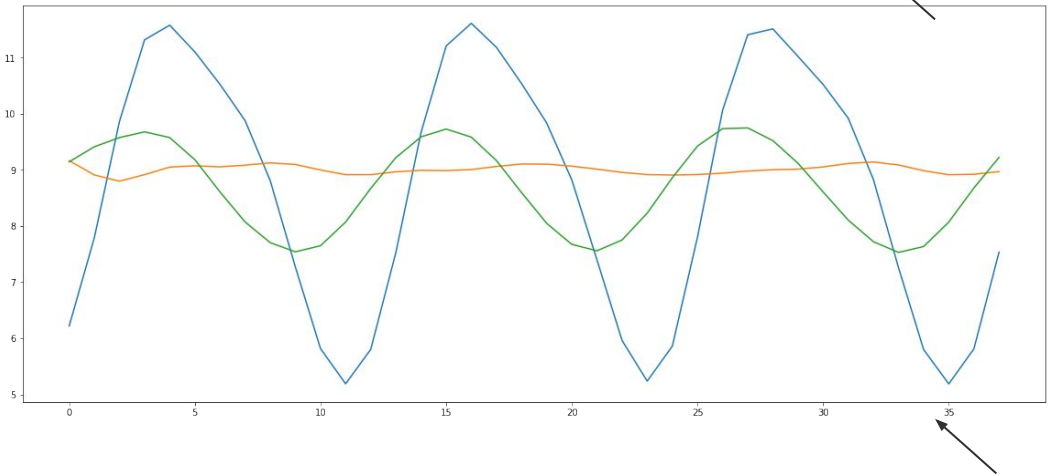


scipy.signal.iirfilter

Gene Expression. Filtering noise

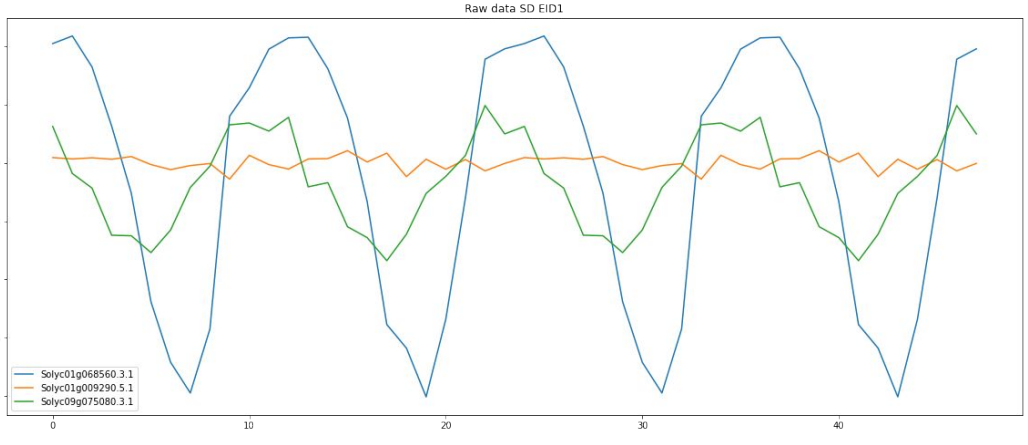


scipy.signal.iirfilter

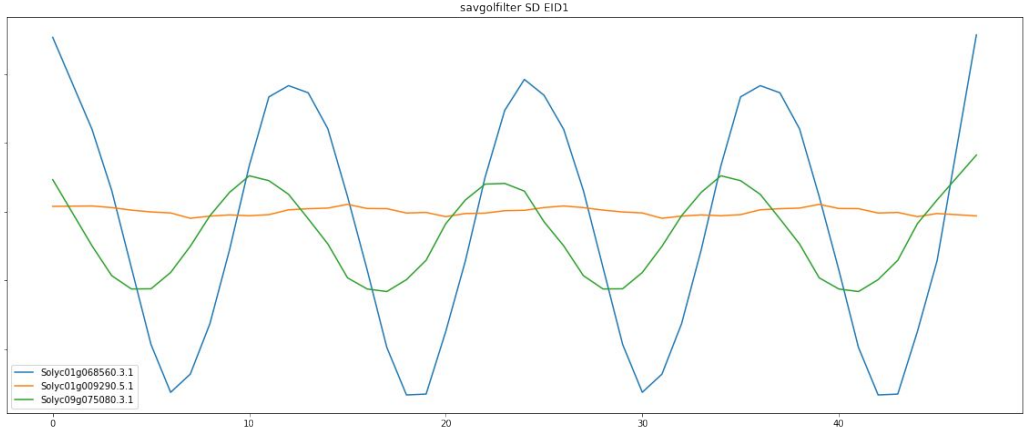


Pröll,S., 2022

Gene Expression. Filtering noise



scipy.signal.savgol_filter



References

- Yanli Xiang, Thomas Sapir, Pauline Rouillard, Marina Ferrand & José M. Jiménez-Gómez Interaction between photoperiod and variation in circadian rhythms in tomato. BMC Plant Biol 22, 187 (2022). https://doi.org/10.1186/s12870-022-03565-1
- Samuel Pröll, Finding peaks in noisy signals (with Python and JavaScript). https://www.samproell.io/posts/signal/peak-finding-python-js/
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