0 : 2.0 H2O_h + 4.0 H_h + 2.0 PQ_h + 4.0 hnu_h --> 4.0 H_l + O2_h + 2.0 PQH2_h

', 'AT1G79040', 'ATCG00300', 'ATCG00270', 'AT4G05180', 'ATCG00690', 'AT1G44575', 'ATCG00710', 'ATCG00550', 'ATCG00070', 'ATCG00570',
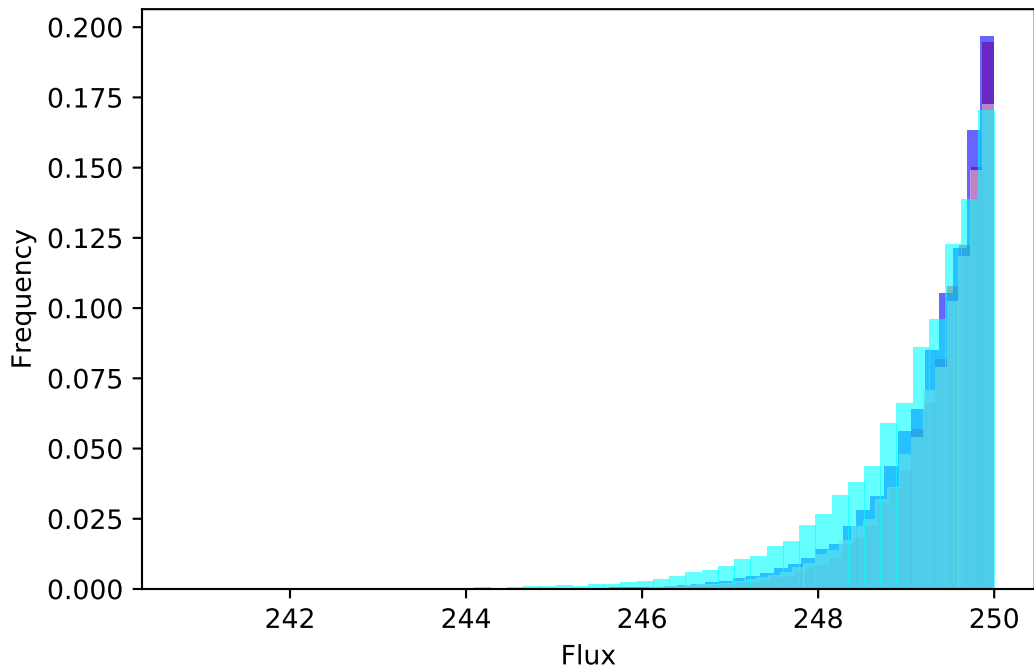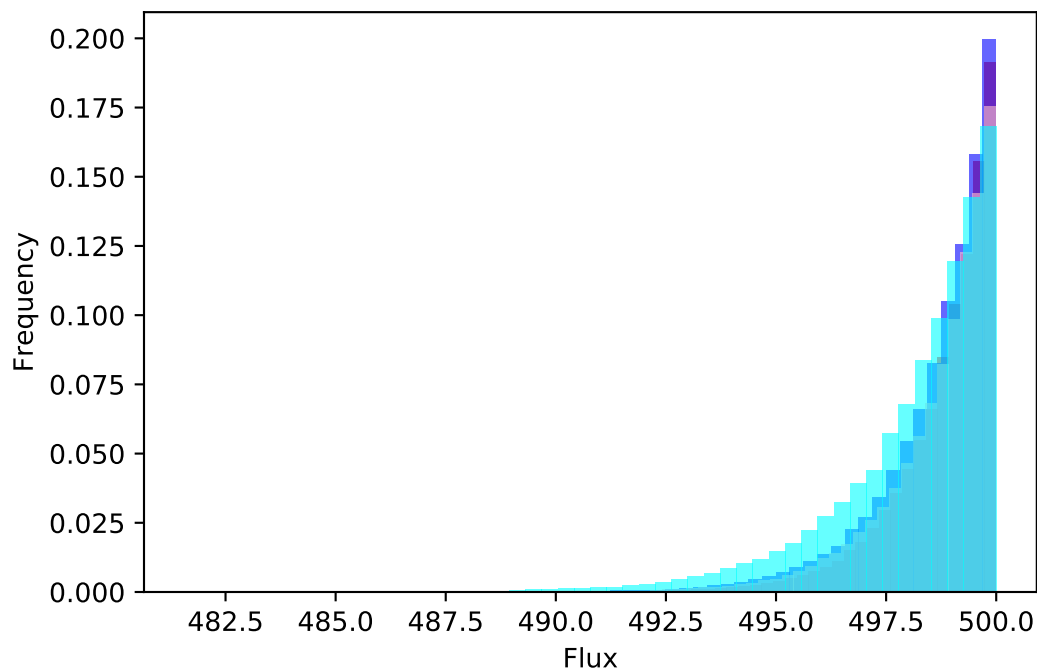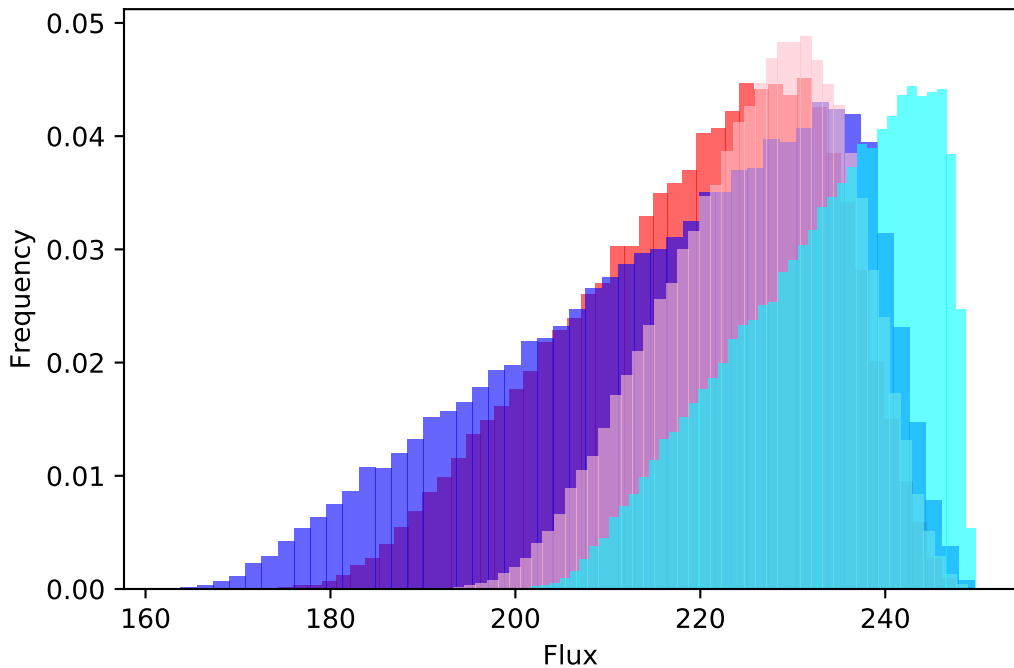
1 : 2.0 H_h + 2.0 PCox_h + PQH2_h --> 4.0 H_l + 2.0 PCrd_h + PQ_h
['2*ATCG00540', 'ATCG00210', 'ATCG00590', 'AT2G26500', 'AT4G03280', 'ATCG00720', 'ATCG00600', 'ATCG00730']
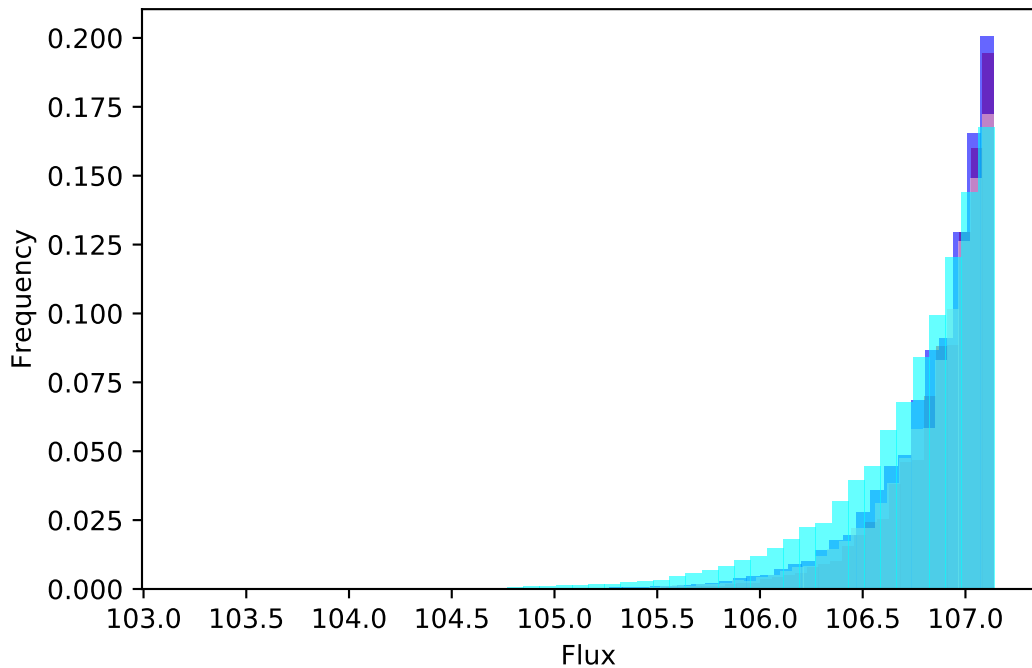
2 : Fdox_h + PCrd_h + hnu_h --> Fdrd_h + PCox_h

'0', 'AT4G28750', 'ATCG00510', 'AT5G64040', 'AT4G02770', 'AT1G52230', 'AT2G20260', 'AT1G03130', 'AT1G31330', 'AT2G46820', 'AT1G08380'
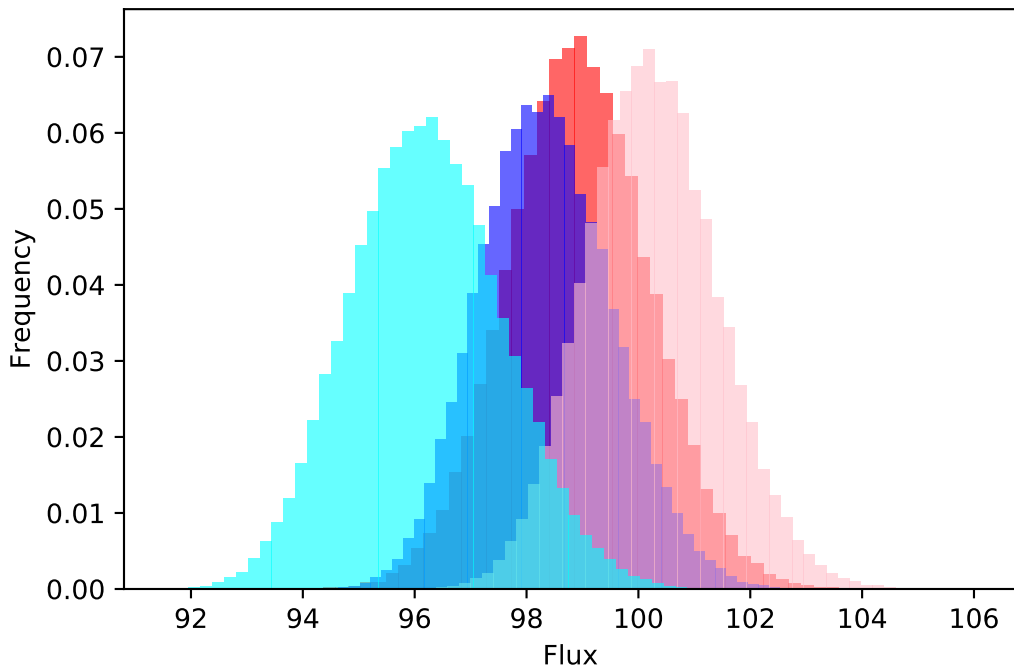
3 : 2.0 Fdrd_h + H_h + NADP_h --> 2.0 Fdox_h + NADPH_h
['AT5G66190', 'AT1G20020']

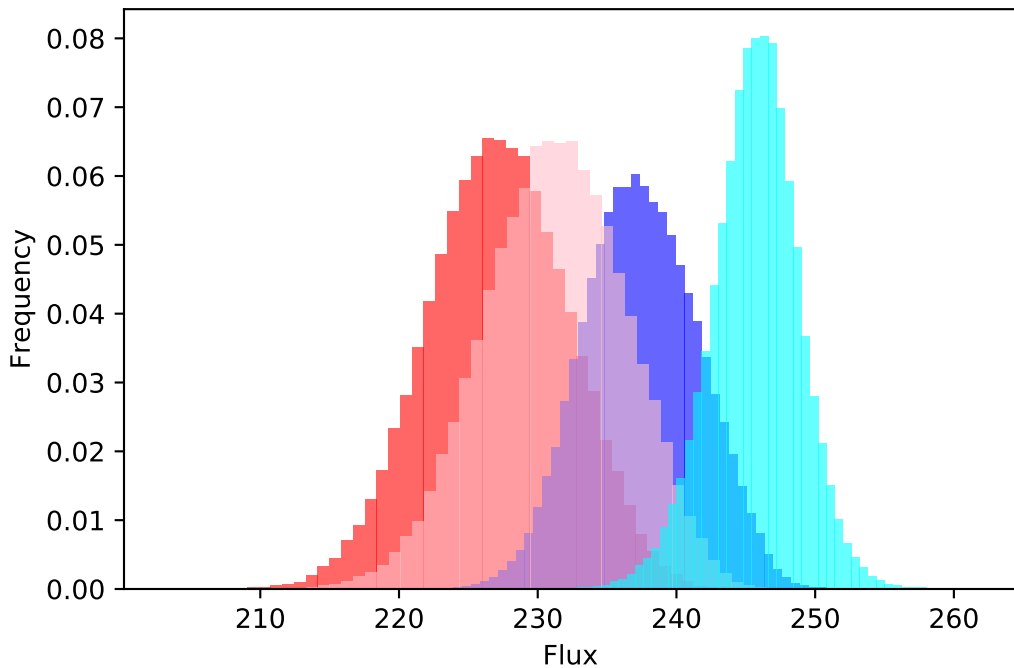4 : 3.0 ADP_h + 14.0 H_l + 3.0 Pi_h <=> 3.0 ATP_h + 3.0 H2O_h + 11.0 H_h
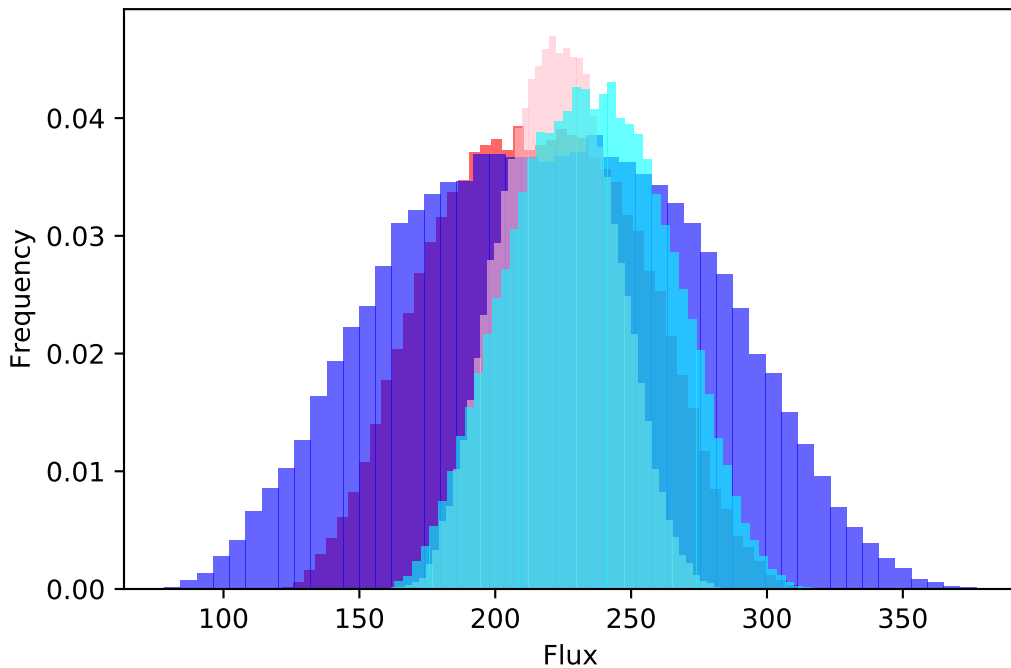['AT5G66190', 'AT1G20020']

5 : CO2_h + H2O_h + RuBP_h --> 2.0 H_h + 2.0 PGA_h
['AT1G67090', '8*AT5G38430', 'AT5G38410', '8*ATCG00490', 'AT5G38420']

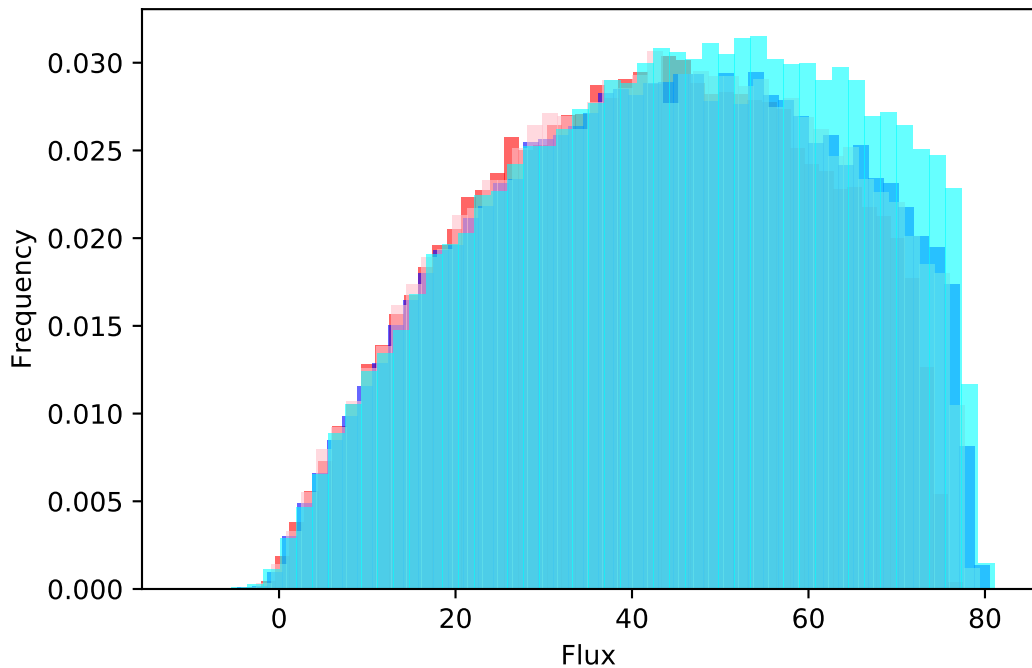6 : ATP_h + PGA_h <=> ADP_h + DPGA_h
['AT3G12780', 'AT1G56190']

7 : DPGA_h + H_h + NADPH_h --> GAP_h + NADP_h + Pi_h
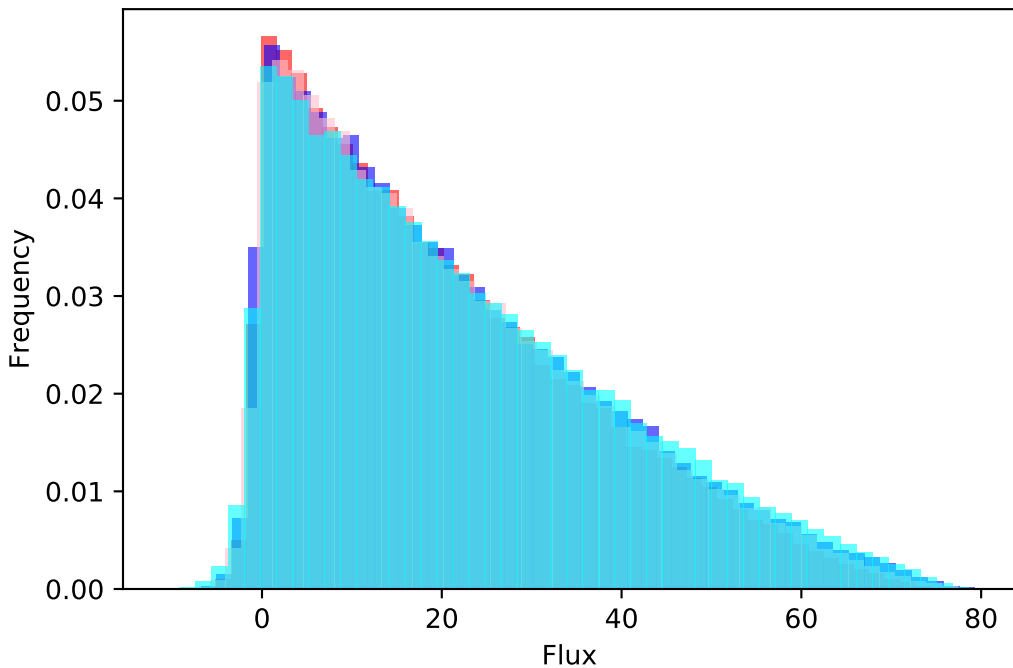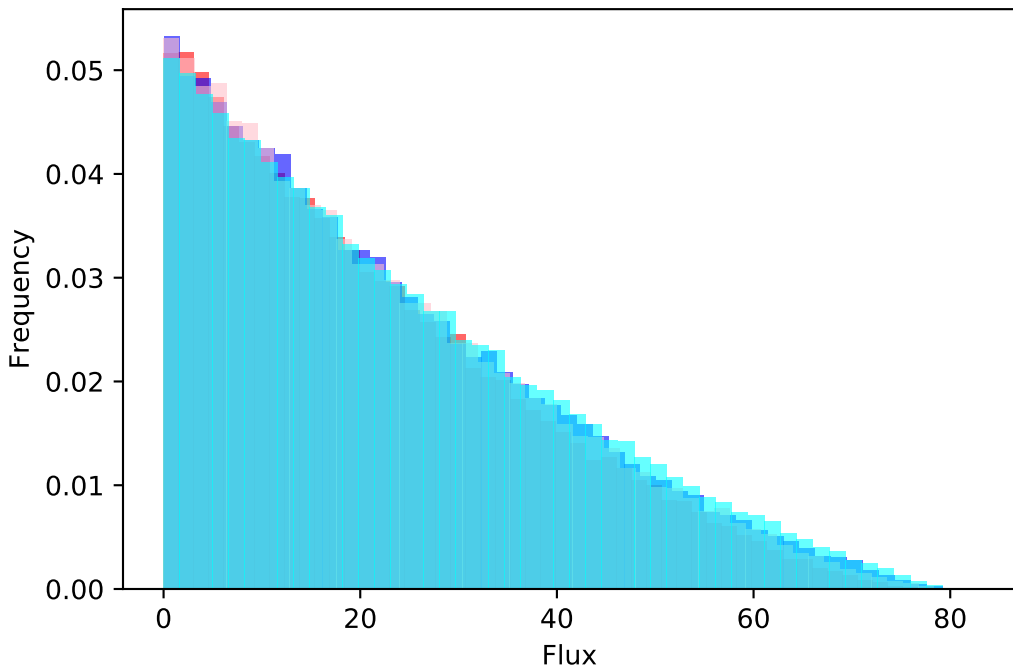['2*AT1G42970', 'AT1G12900', '4*AT3G26650', '2*AT3G26650']
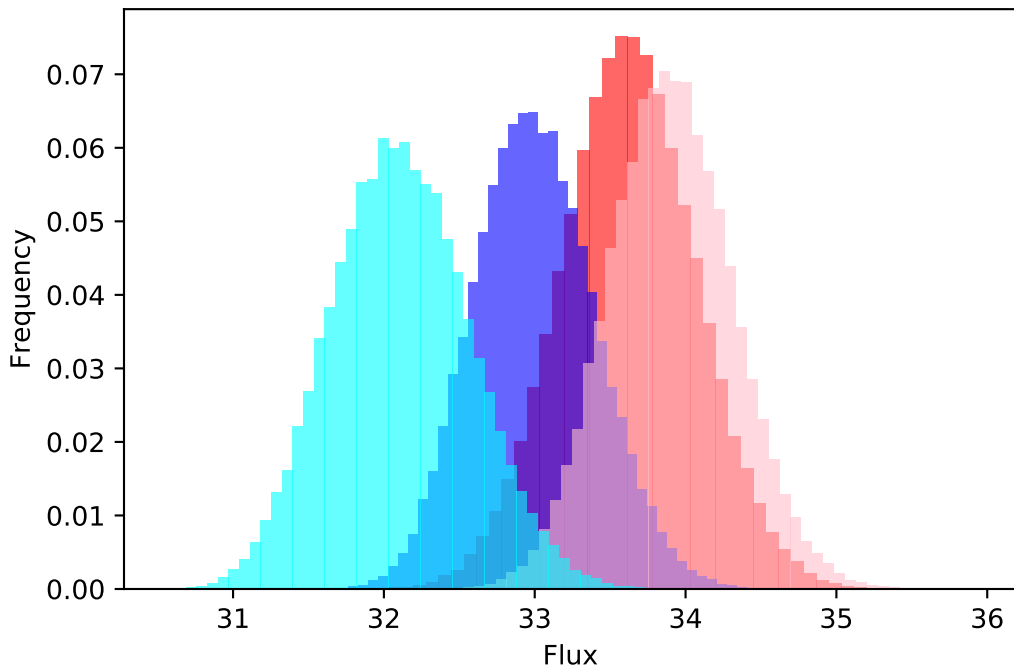
8 : GAP_h <=> DHAP_h
['AT2G21170', '2*AT3G55440']

9 : DHAP_h + GAP_h <=> FBP_h
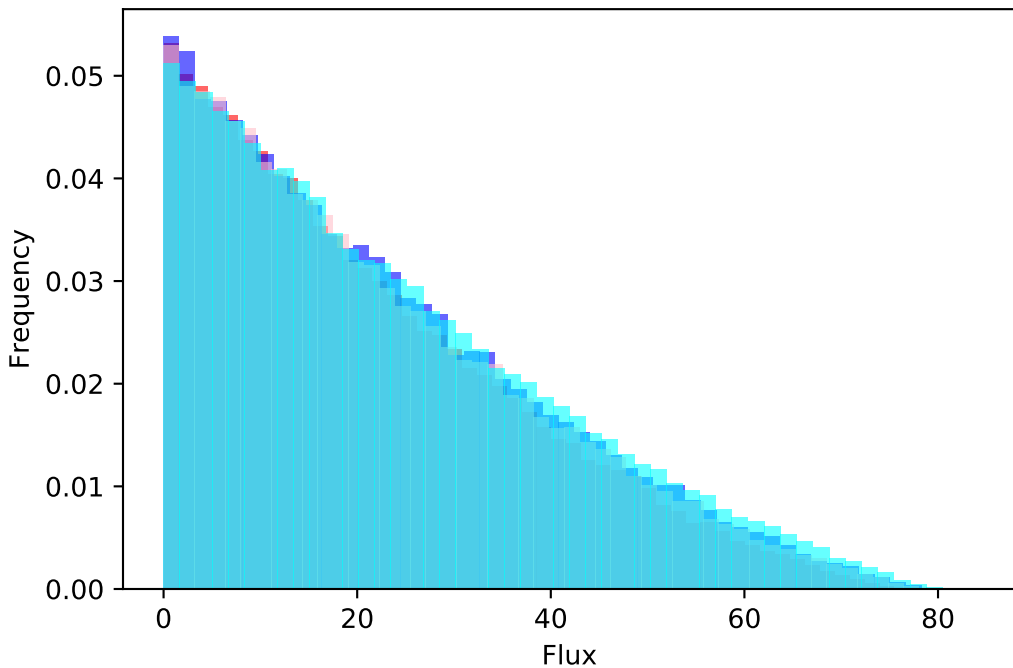['AT4G26530', 'AT3G52930', '4*AT2G01140', 'AT4G38970', 'AT5G03690', 'AT2G21330']
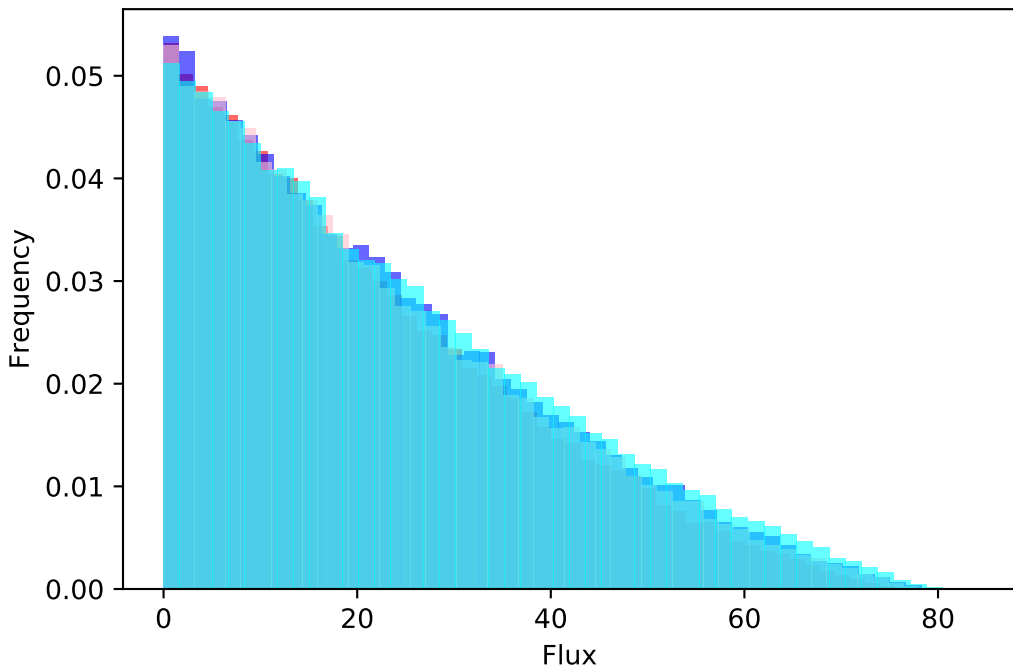
10 : FBP_h + H2O_h --> F6P_h + Pi_h
['4*AT3G54050']

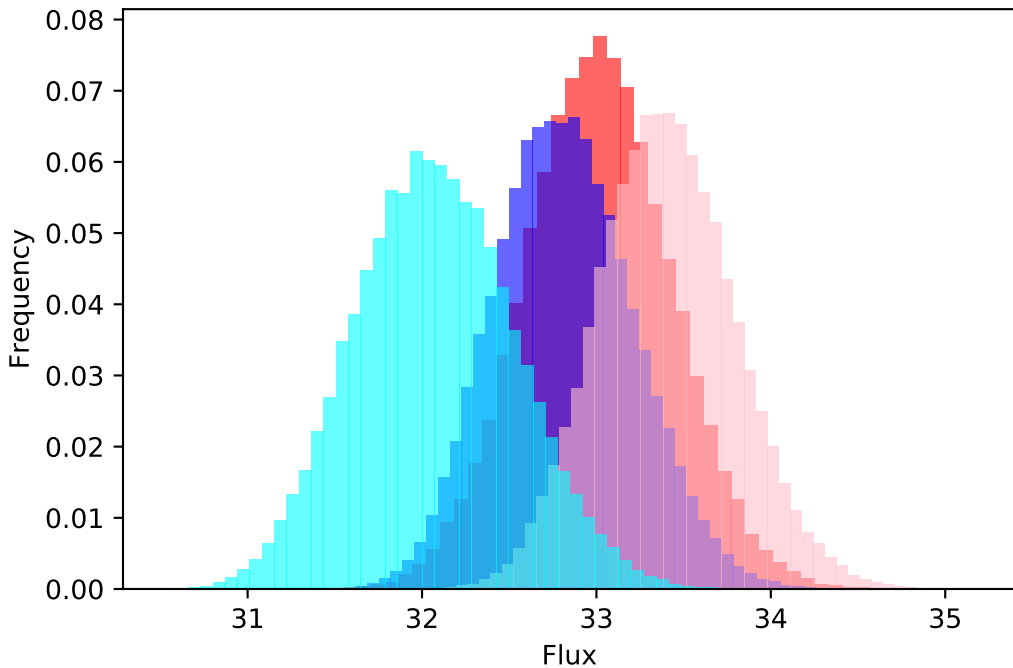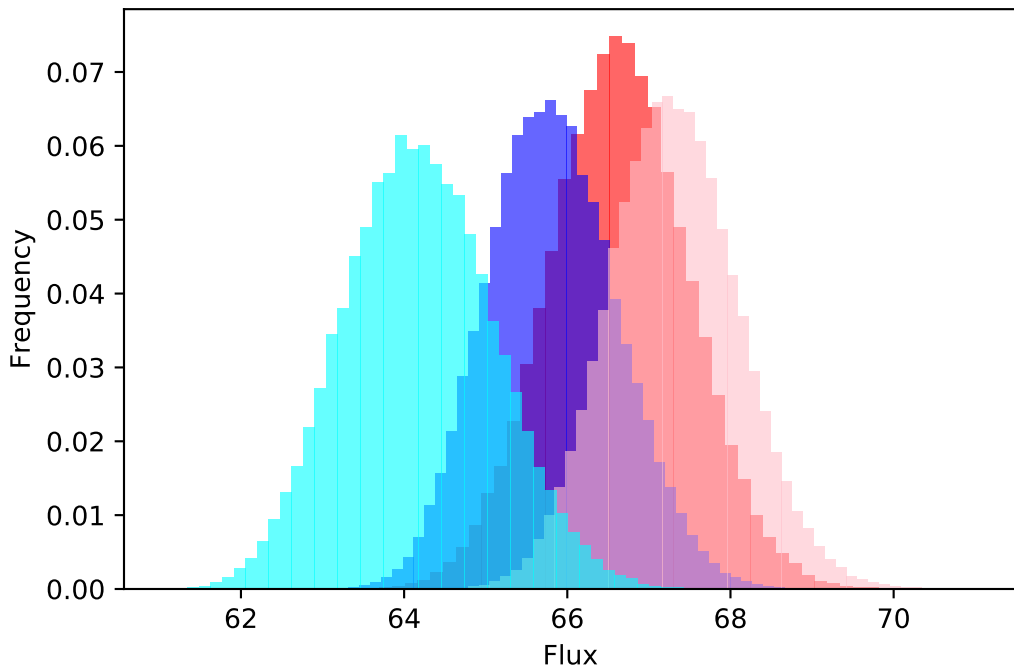11 : F6P_h + GAP_h <=> E4P_h + X5P_h
['2*AT3G60750', 'AT2G45290']

12 : DHAP_h + E4P_h --> SBP_h
['AT4G26530', 'AT3G52930', '4*AT2G01140', 'AT4G38970', 'AT5G03690', 'AT2G21330']

13 : H2O_h + SBP_h --> Pi_h + S7P_h
['2*AT3G55800']

14 : GAP_h + S7P_h <=> R5P_h + X5P_h
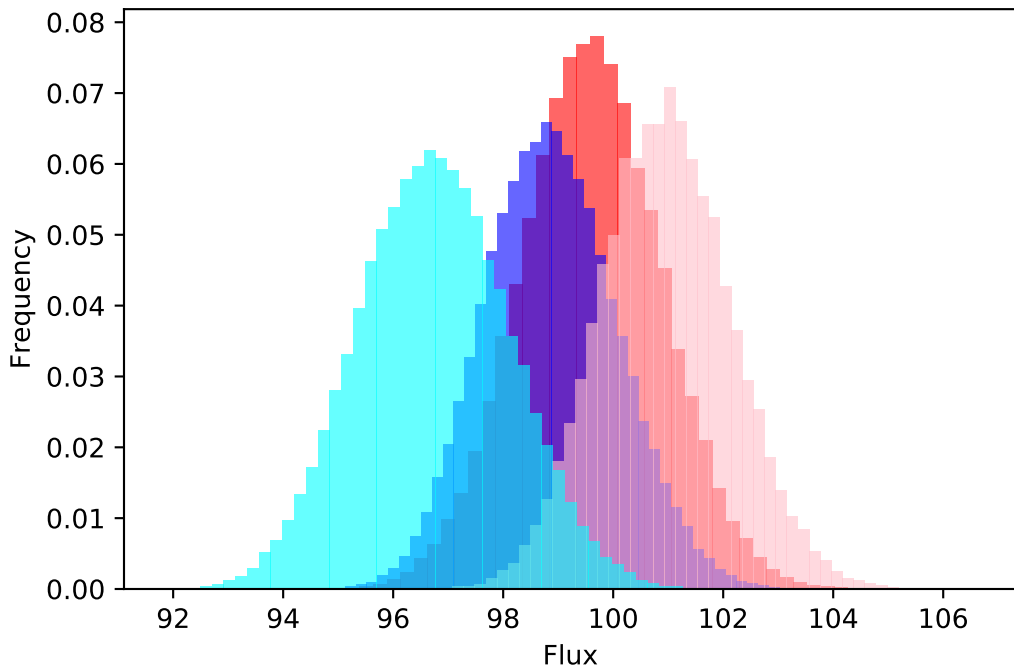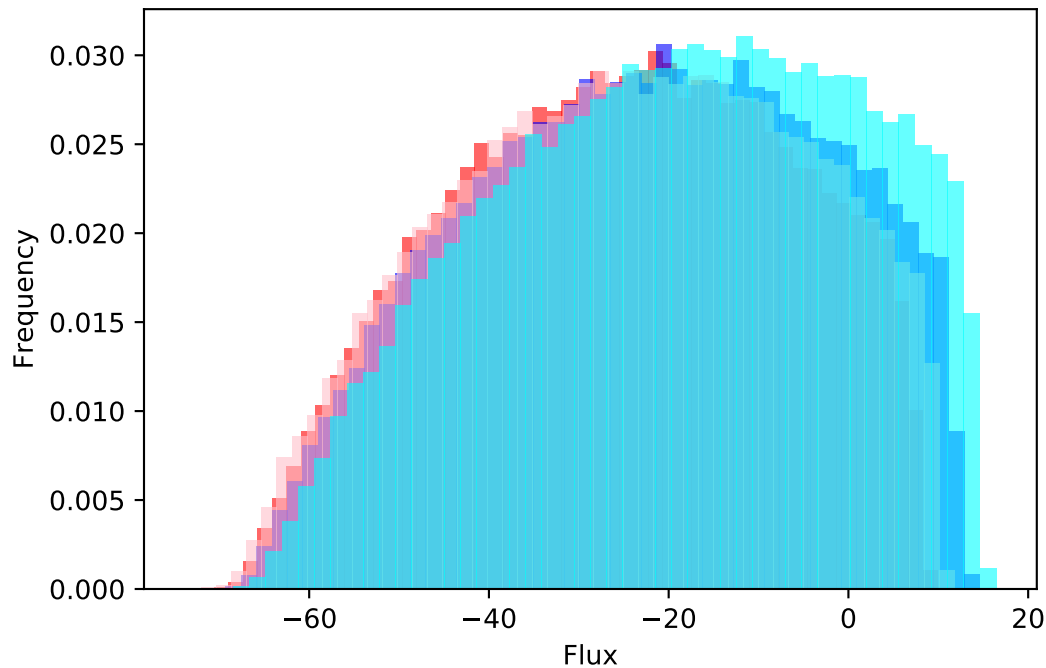['2*AT3G60750', 'AT2G45290']

15 : X5P_h <=> Ru5P_h
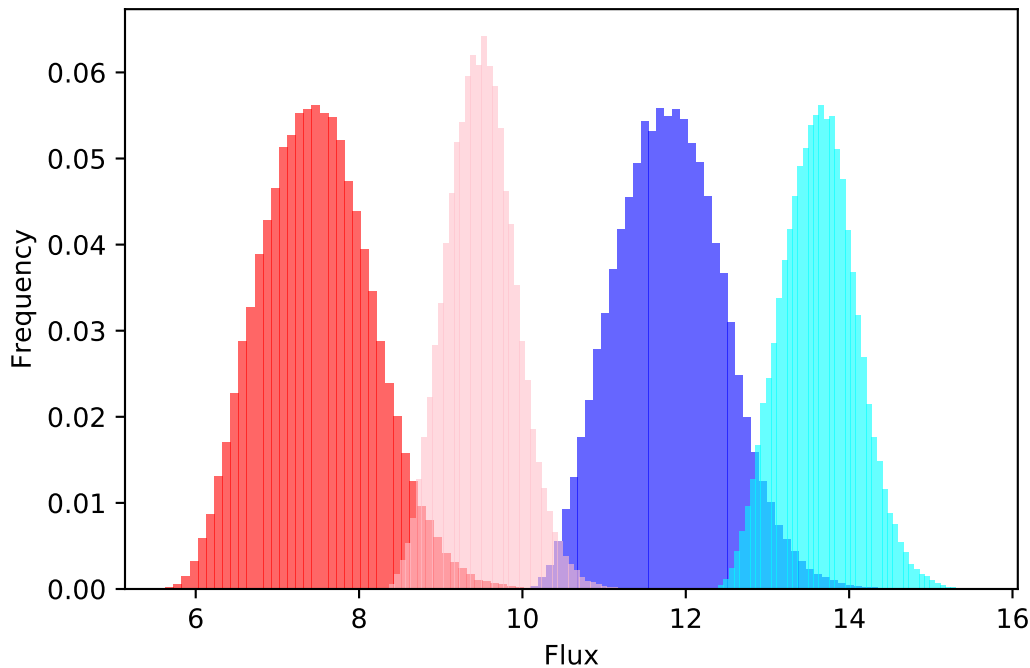['8*AT5G61410']

16 : R5P_h <=> Ru5P_h
['2*AT3G04790']
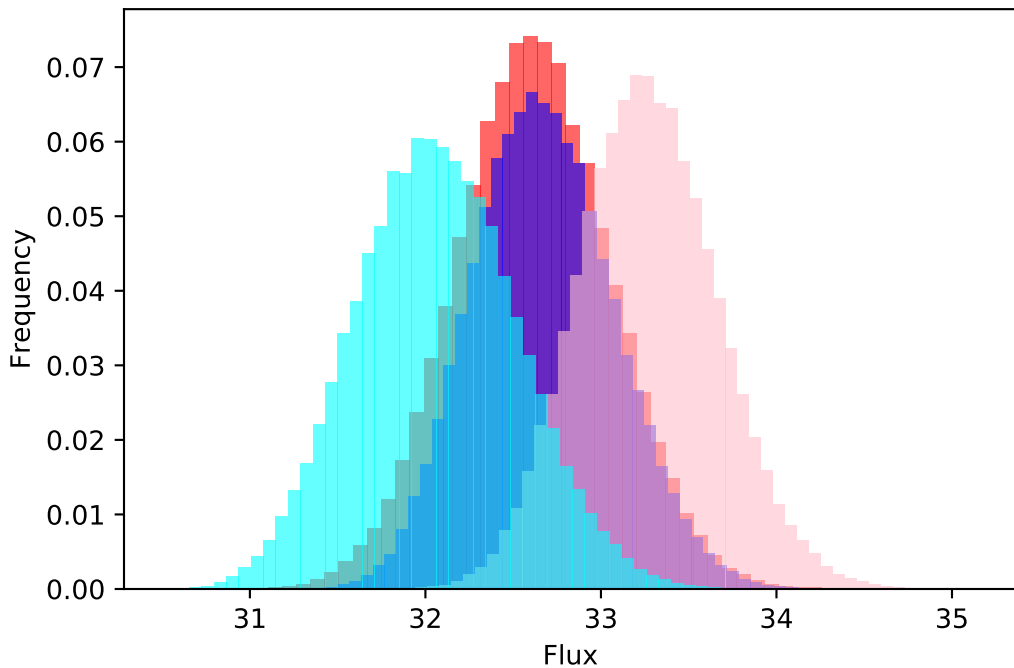
17 : ATP_h + Ru5P_h --> ADP_h + H_h + RuBP_h
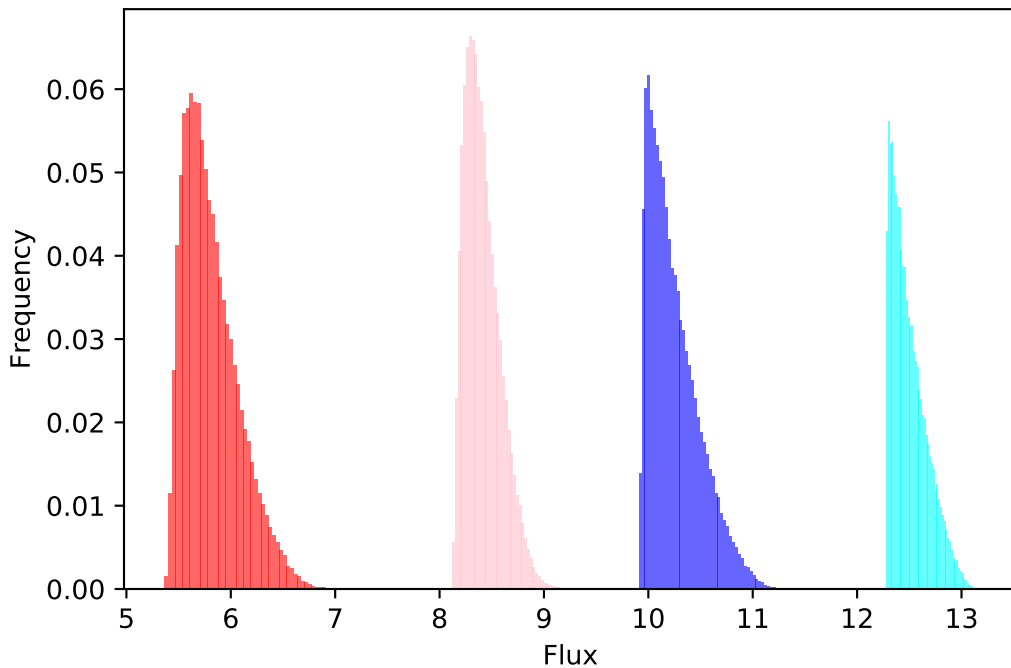['2*AT1G32060']

18 : F6P_h <=> G6P_h
['2*AT4G24620']

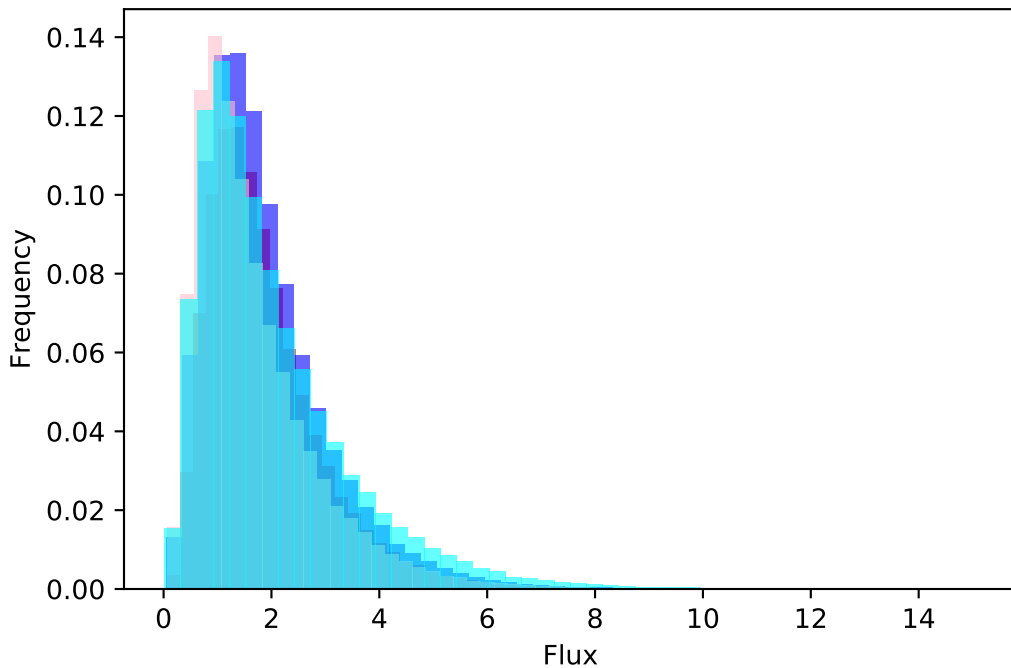19 : G6P_h <=> G1P_h
['AT1G70730', 'AT5G51820', 'AT1G23190']

20 : ATP_h + G1P_h --> ADPG_h + PPi_h
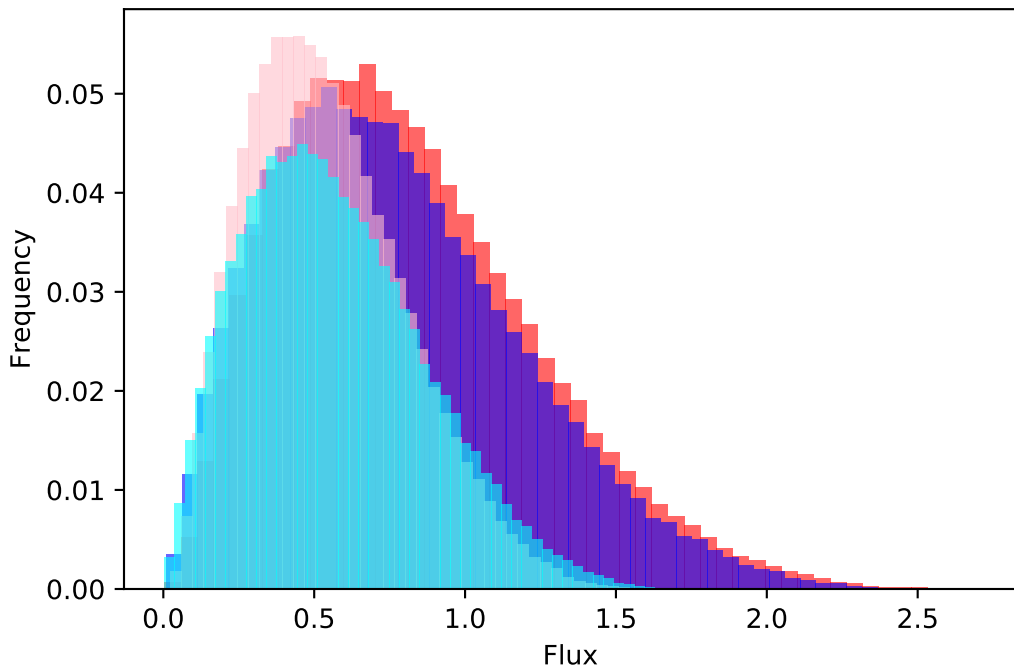['AT4G39210', 'AT1G27680', 'AT2G21590', '2*AT5G48300', '2*AT5G19220', 'AT1G05610']
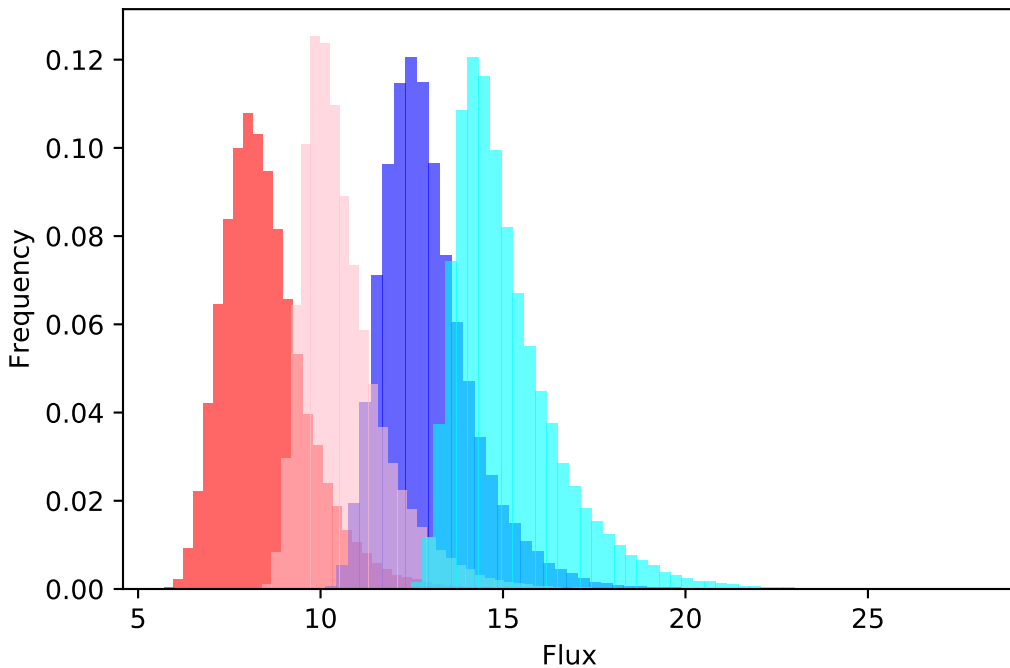
21 : ADPG_h + H2O_h --> ADP_h + H_h + starch1_h
['AT1G11720', 'AT3G01180', 'AT5G24300', 'AT4G18240']

22 : ADPG_h + starch1_h --> ADP_h + H_h + starch2_h
['AT3G01180', 'AT1G11720', 'AT5G24300', 'AT4G18240']

23 : ADPG_h + starch2_h --> ADP_h + H_h + starch3_h
['AT4G18240', 'AT1G11720', 'AT5G24300', 'AT3G01180']

24 : H2O_h + starch5_h --> Mas_h + starch3_h
['AT4G15210', 'AT2G32290', 'AT4G00490', 'AT1G69830', 'AT3G23920', 'AT5G18670', 'AT4G17090']
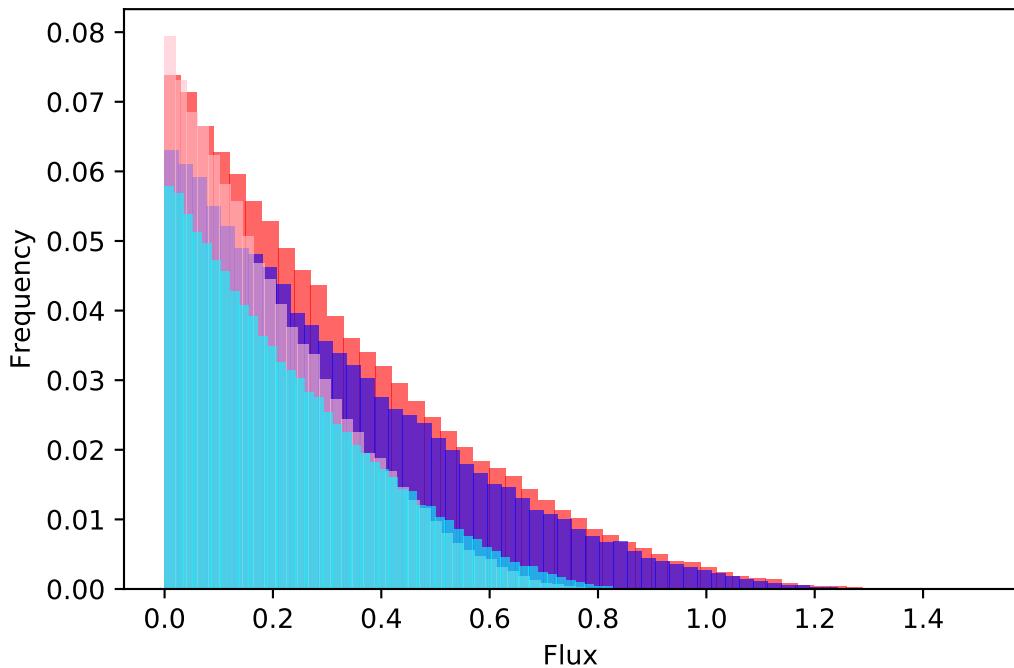
25 : H2O_h + starch3_h --> Mas_h + starch1_h
['AT4G15210', 'AT2G32290', 'AT4G00490', 'AT1G69830', 'AT4G17090', 'AT5G18670', 'AT3G23920']
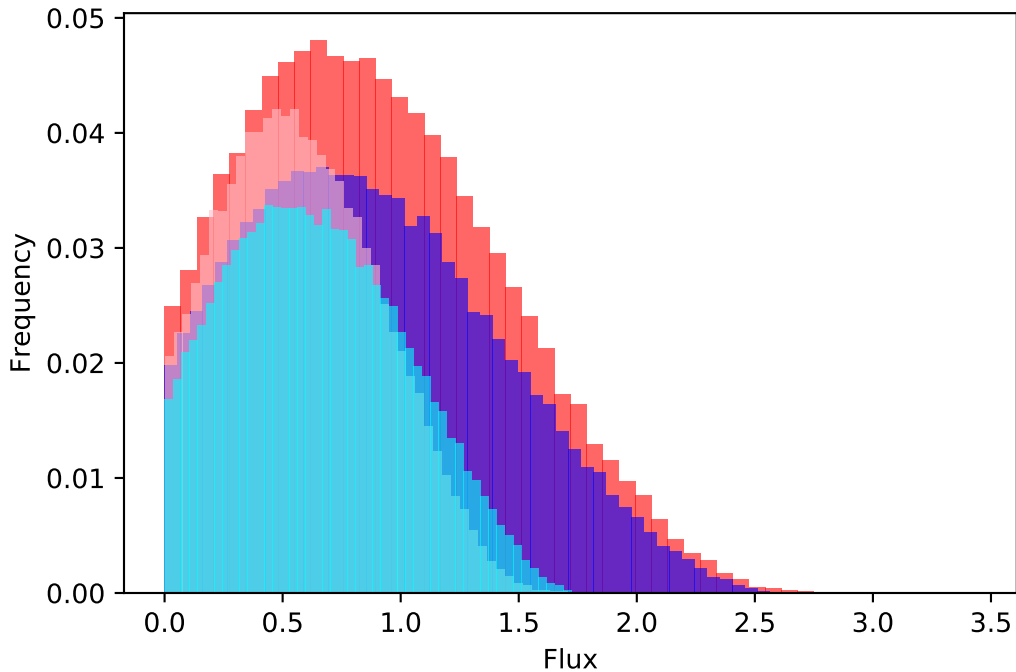
26 : 2.0 starch3_h --> Glc_h + starch5_h
['AT2G40840', 'AT5G64860']
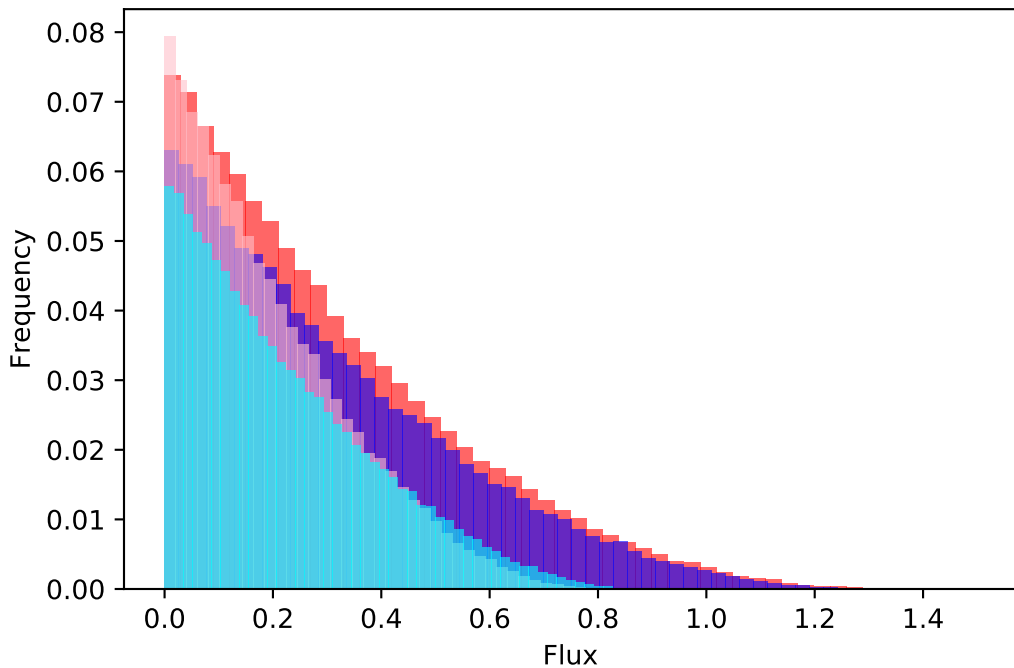
27 : Mas_h + starch1_h --> Glc_h + starch2_h
['AT2G40840', 'AT5G64860']
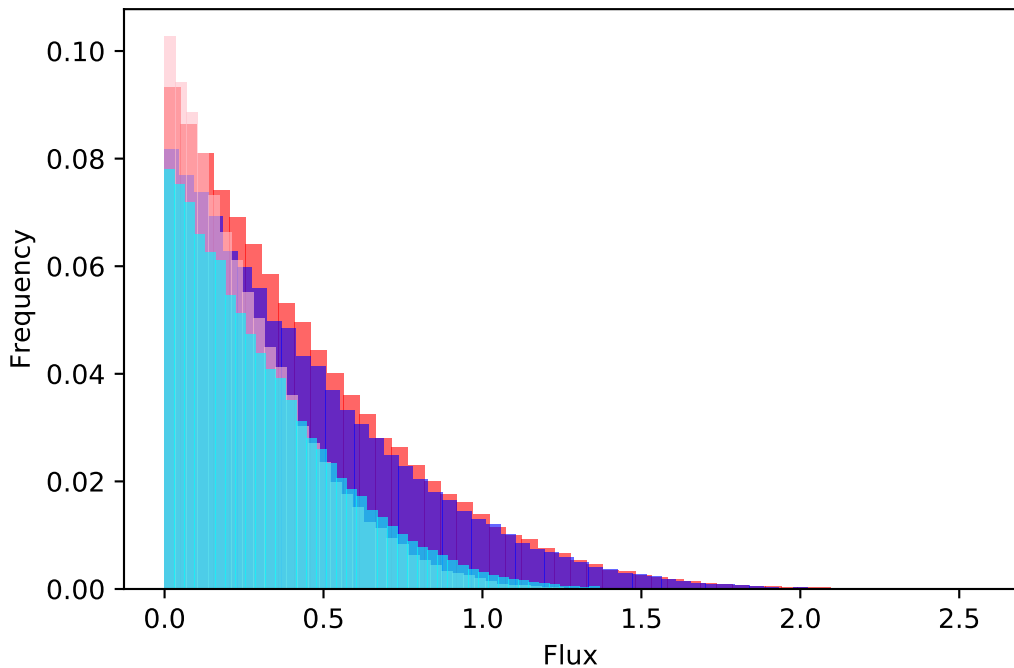
28 : Mas_h + starch2_h --> Glc_h + starch3_h
['AT2G40840', 'AT5G64860']
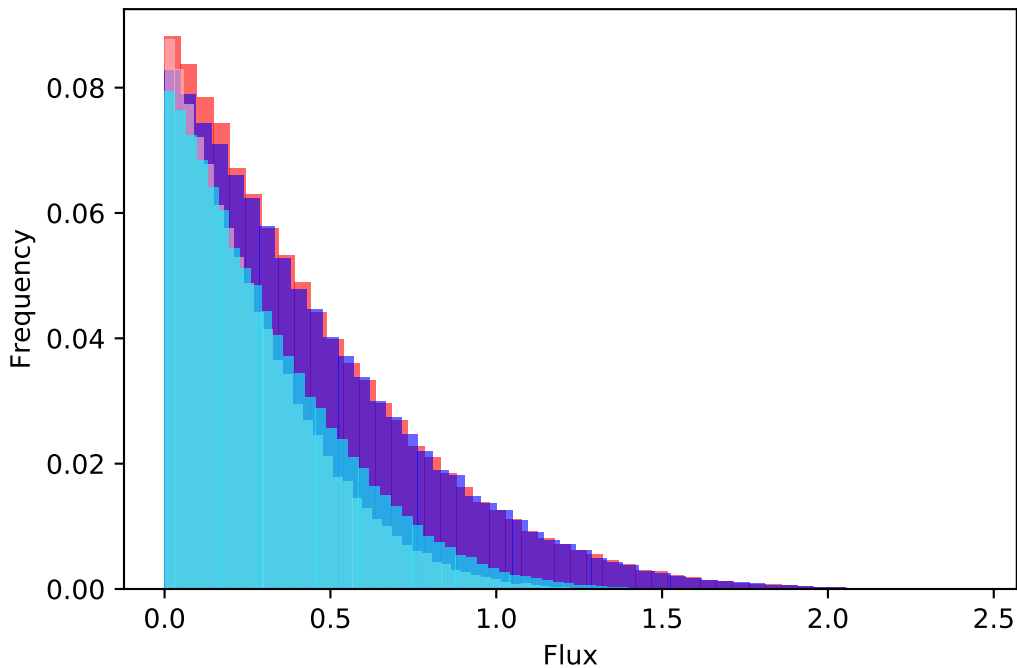
29 : Mas_c + starch1_c --> Glc_c + starch2_c
['AT2G40840', 'AT5G64860']
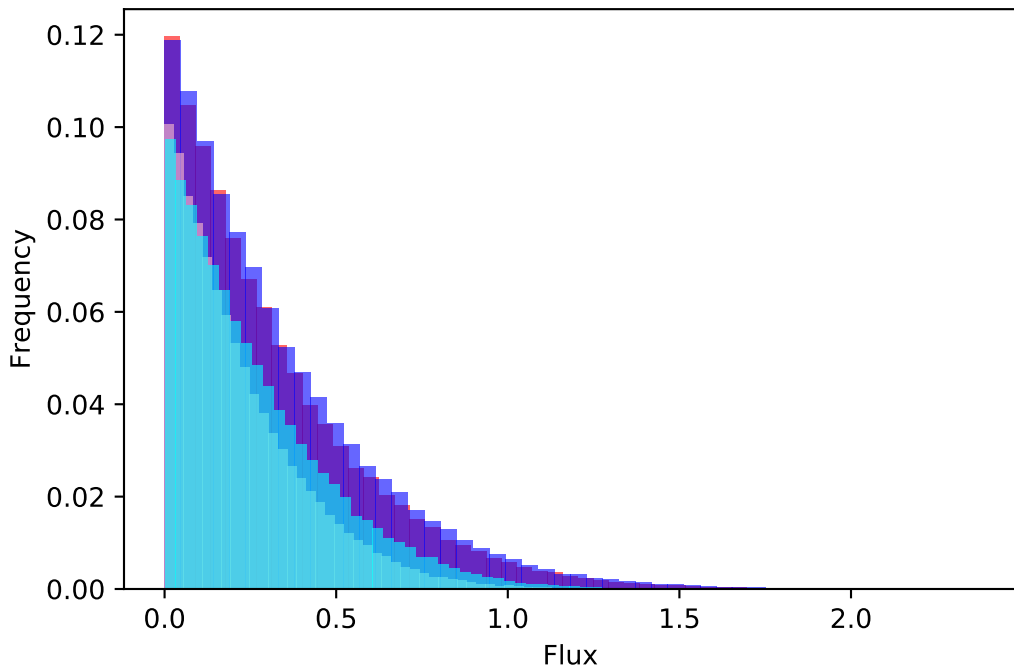
30 : ATP_c + Glc_c --> ADP_c + G6P_c + H_c
['AT2G19860']
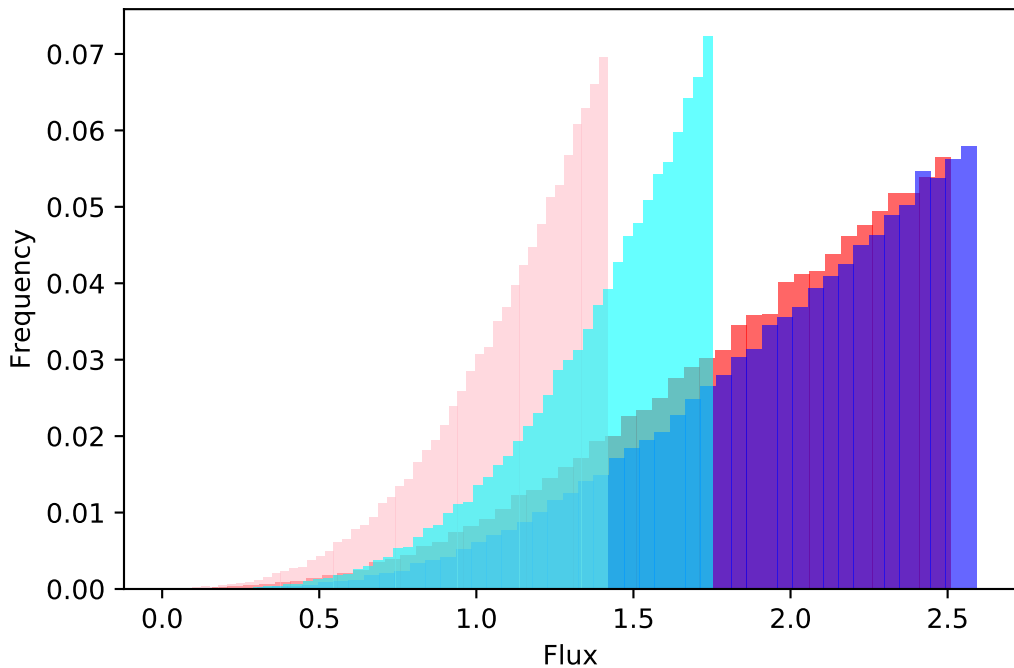
31 : Pi_h + starch2_h --> G1P_h + starch1_h
['AT3G46970', 'AT1G69830']
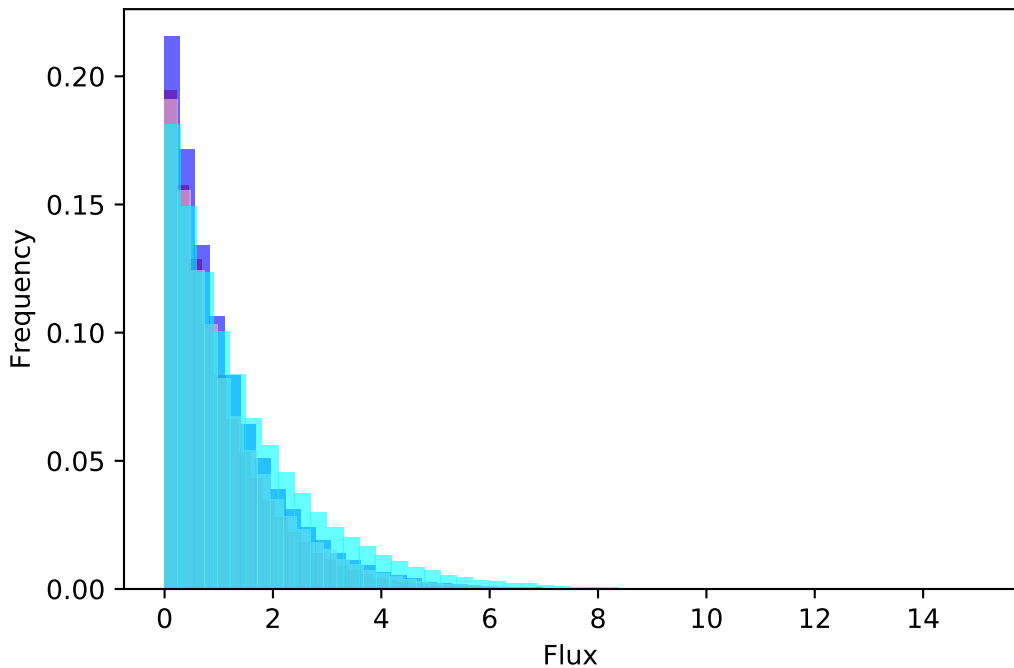
32 : Pi_c + starch2_c --> G1P_c + starch1_c
['AT3G46970']
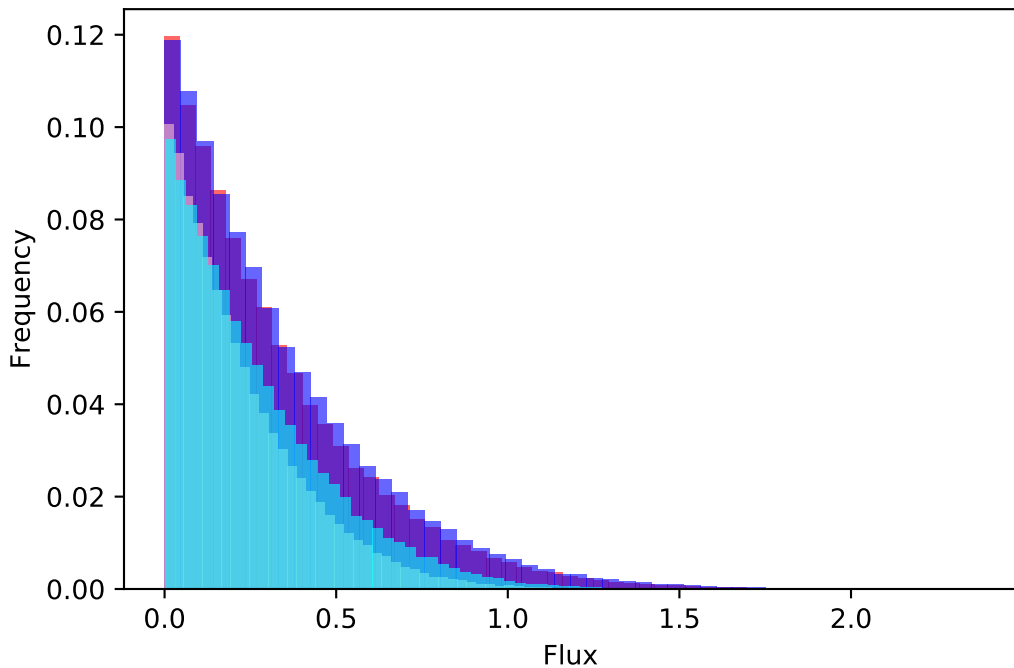
33 : GAP_c <=> DHAP_c
['AT2G21170', '2*AT3G55440']
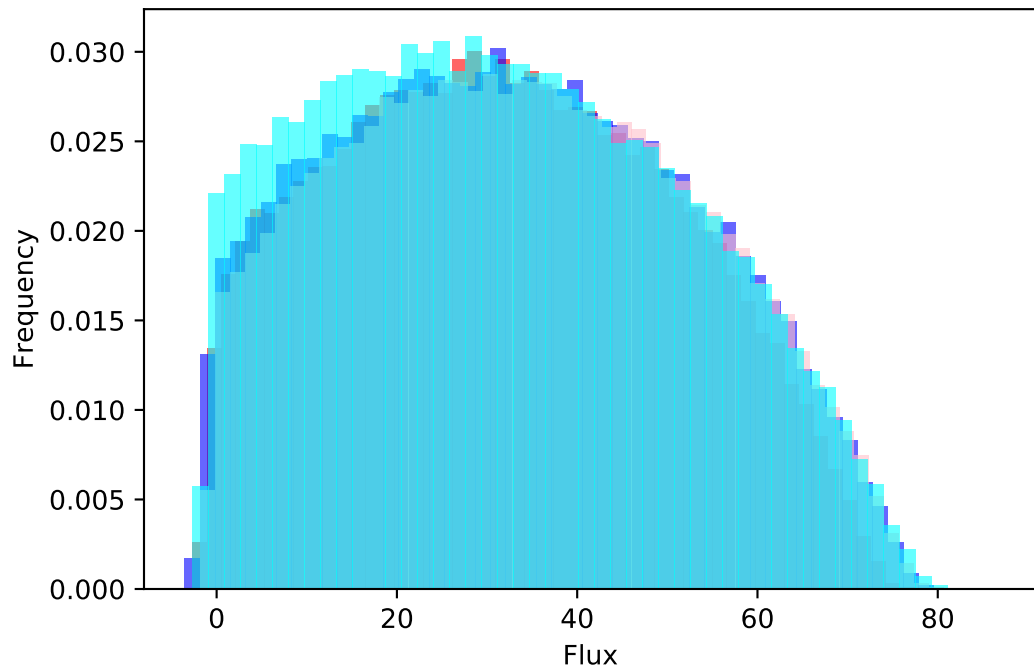
34 : DHAP_c + GAP_c <=> FBP_c
['4*AT4G26520', 'AT5G03690', 'AT2G36460', 'AT3G52930', 'AT4G26530']
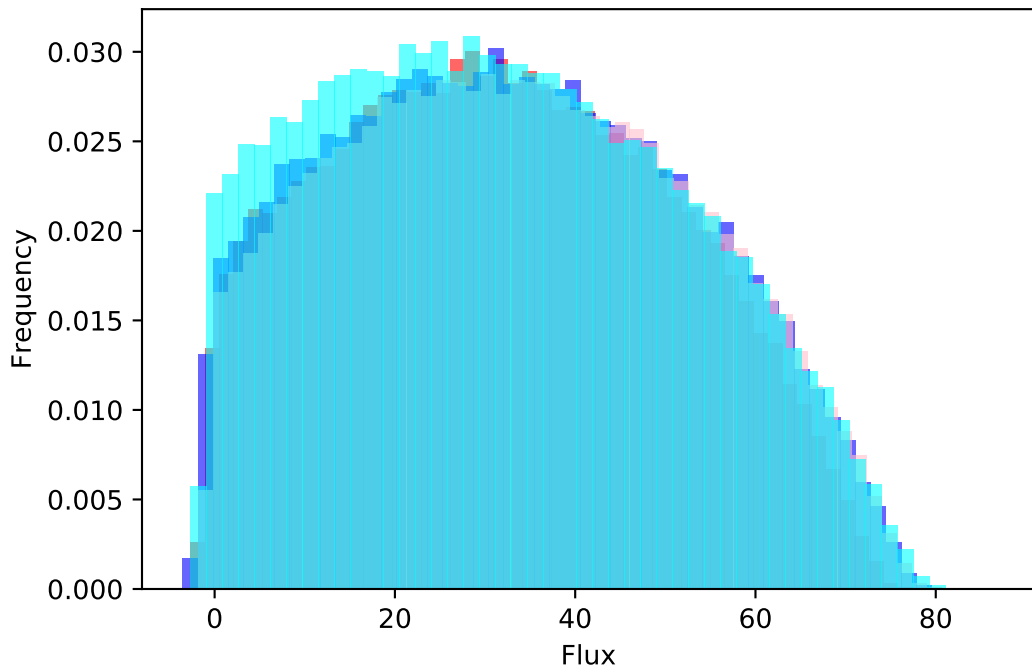
35 : FBP_c + H2O_c --> F6P_c + Pi_c
['4*AT1G43670']
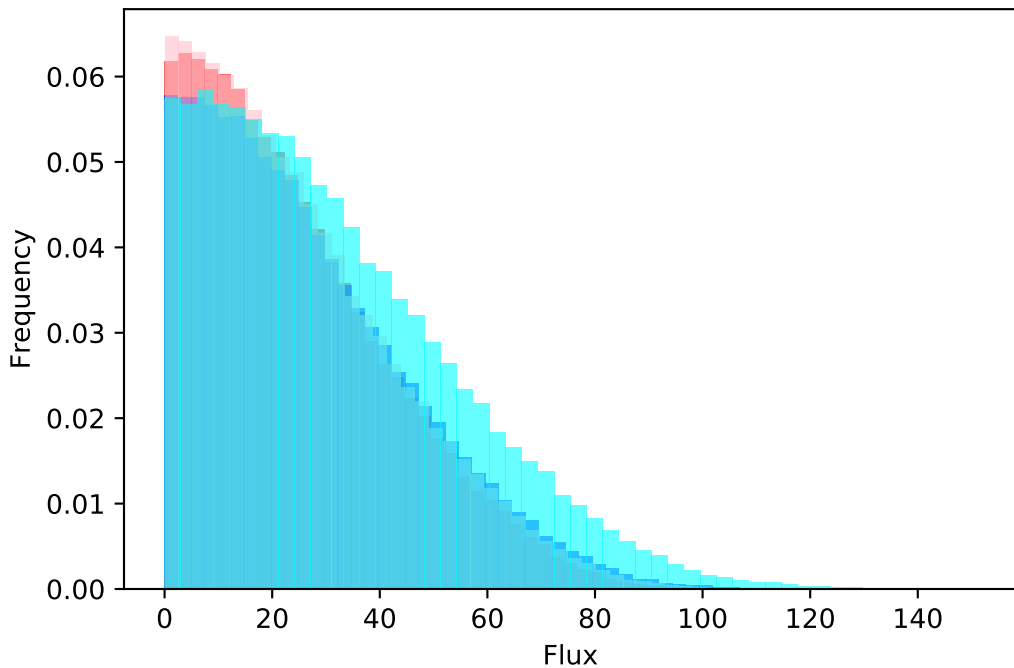
36 : ATP_c + F6P_c --> ADP_c + F26BP_c + H_c
['4*AT1G07110']
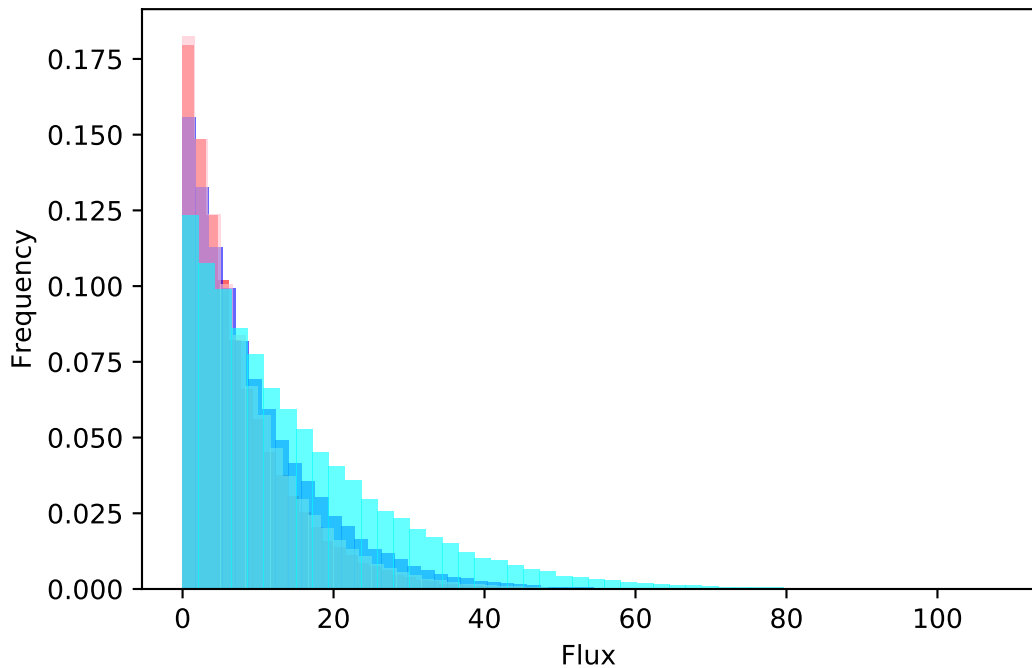
37 : F26BP_c + H2O_c <=> F6P_c + Pi_c
['4*AT1G07110']
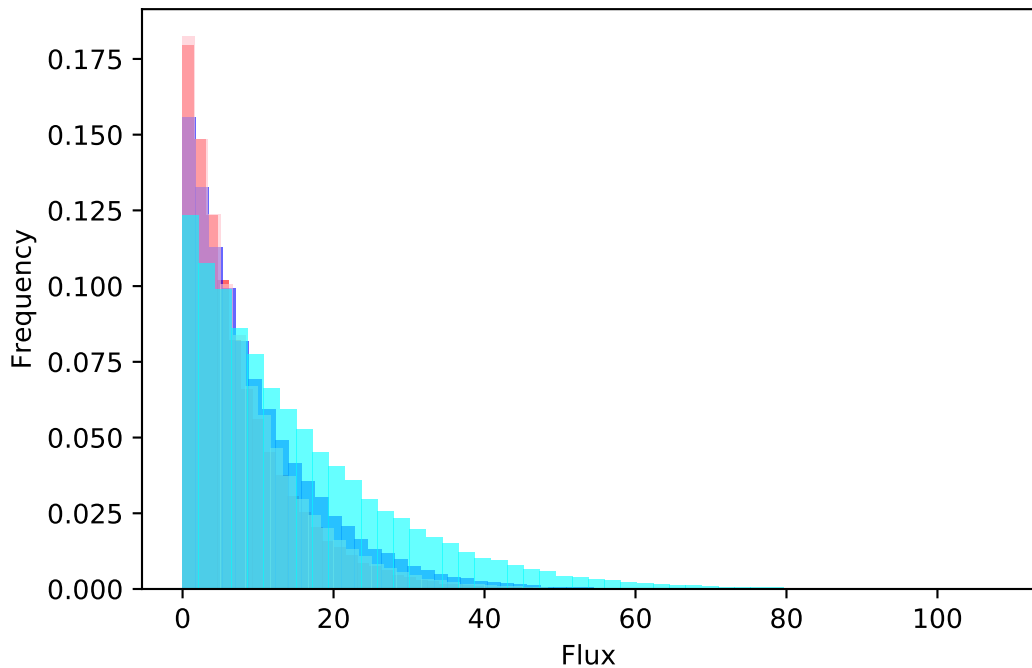
38 : F6P_c <=> G6P_c
['AT5G42740', '2*AT4G24620']
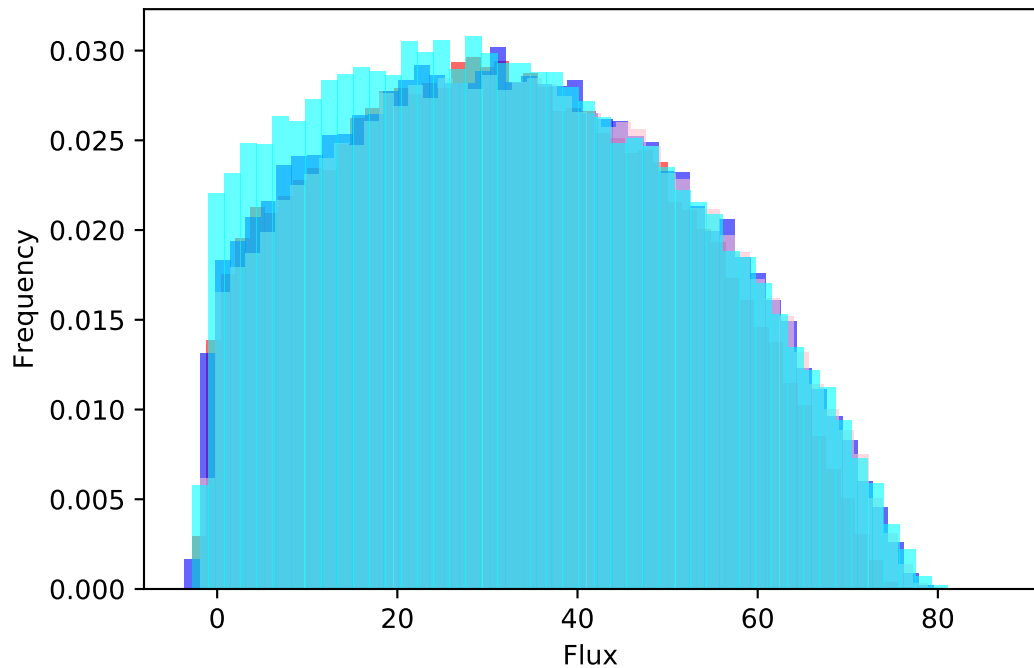
39 : G6P_c <=> G1P_c
['AT1G70730', 'AT5G51820', 'AT1G23190']
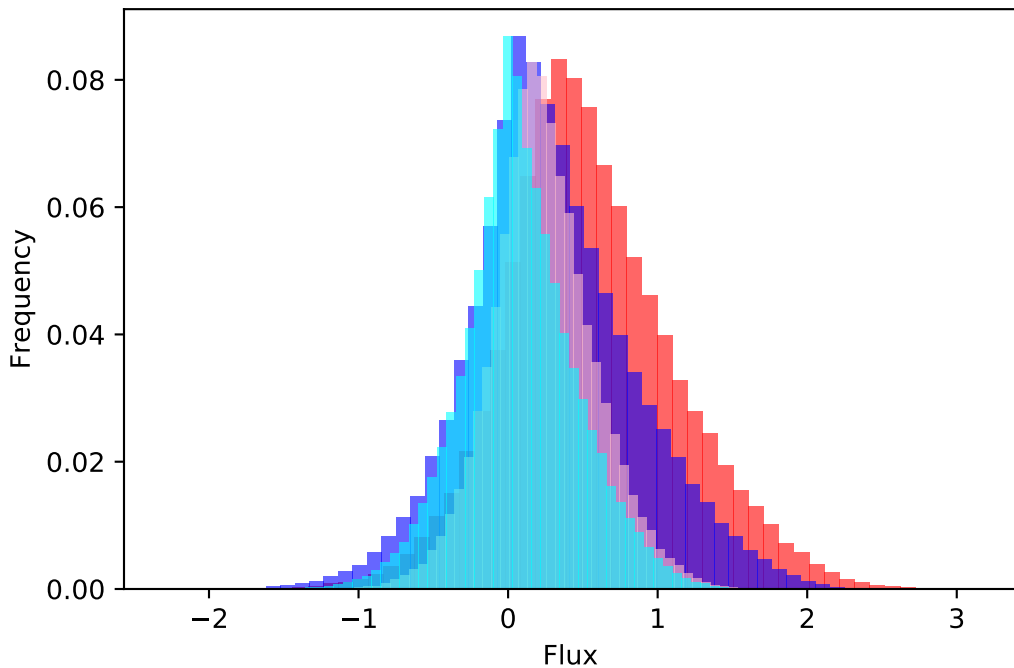
40 : G1P_c + H_c + UTP_c <=> PPi_c + UDPG_c
['AT5G17310', 'AT3G03250']
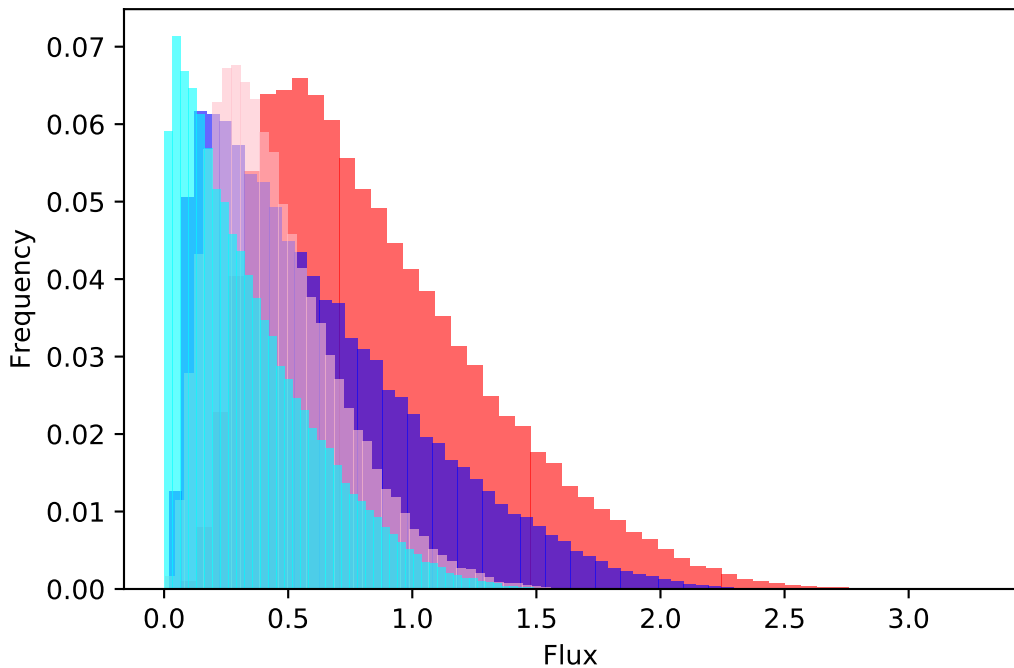
41 : F6P_c + UDPG_c --> S6P_c + UDP_c
['4*AT5G20280', '2*AT5G20280']
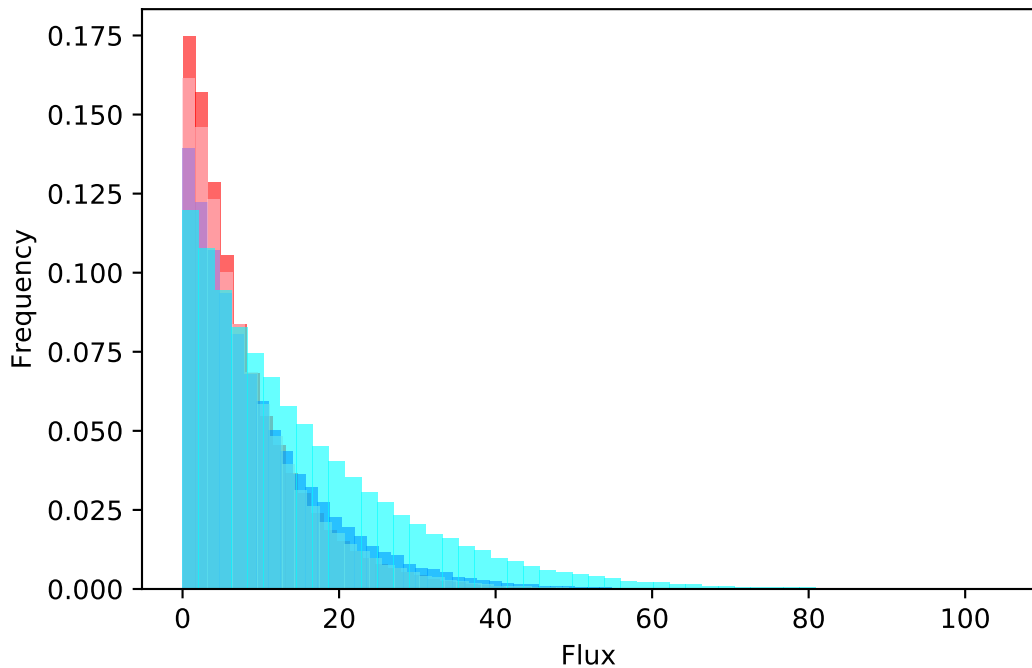
42 : H2O_c + S6P_c --> Pi_c + Suc_c
['AT3G52340', '2*AT2G35840']
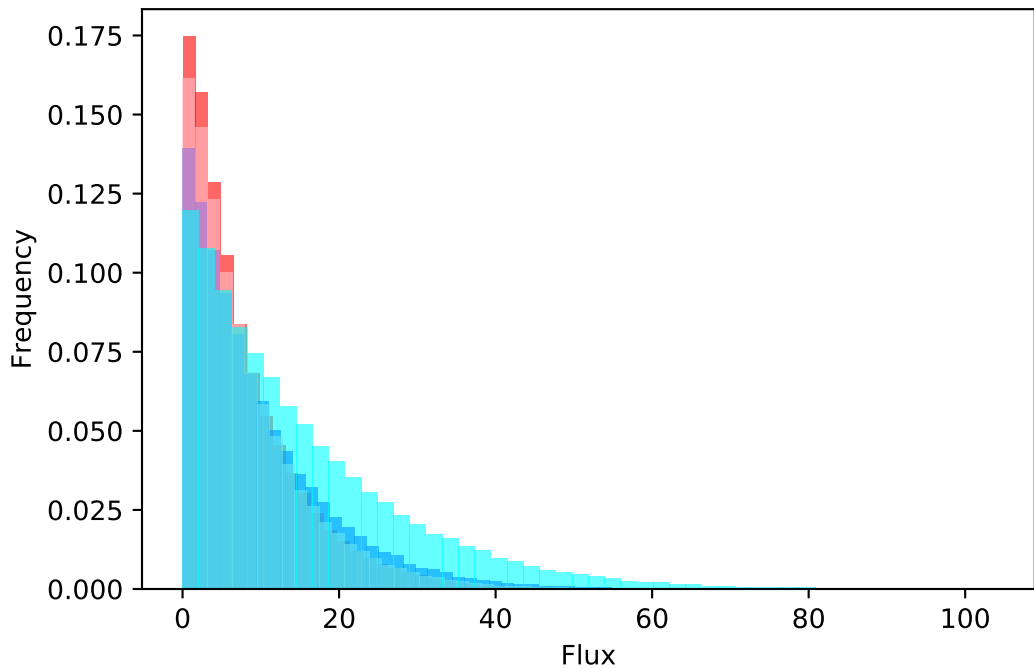
43 : Suc_c + UDP_c <=> Frc_c + UDPG_c
['AT5G49190', '4*AT5G20830', 'AT3G43190']
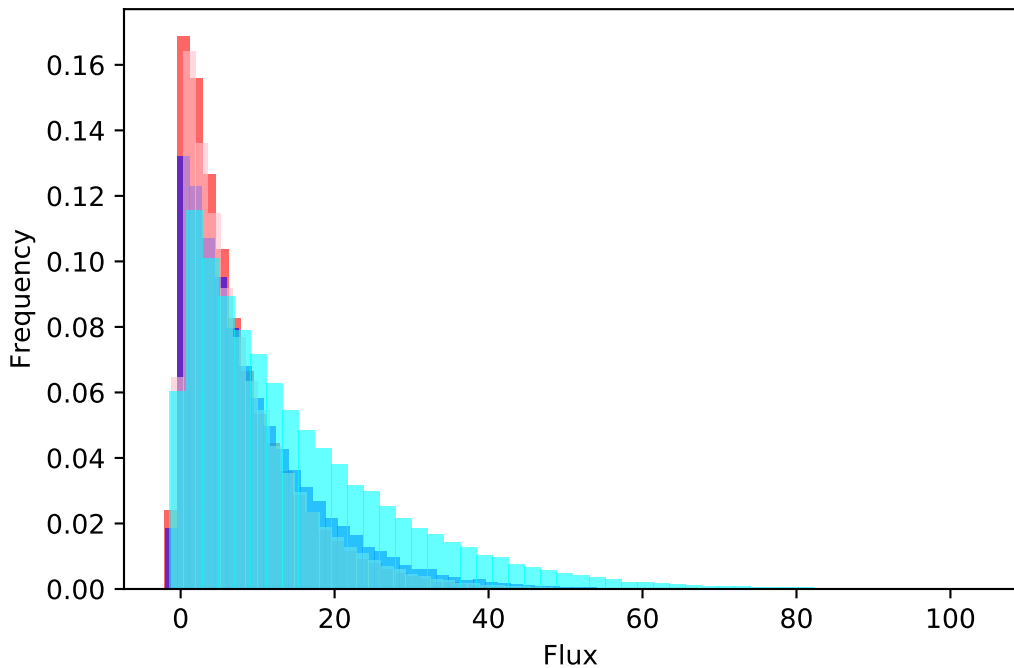
44 : H2O_c + Suc_c --> Frc_c + Glc_c
['AT4G09510', 'AT1G35580']
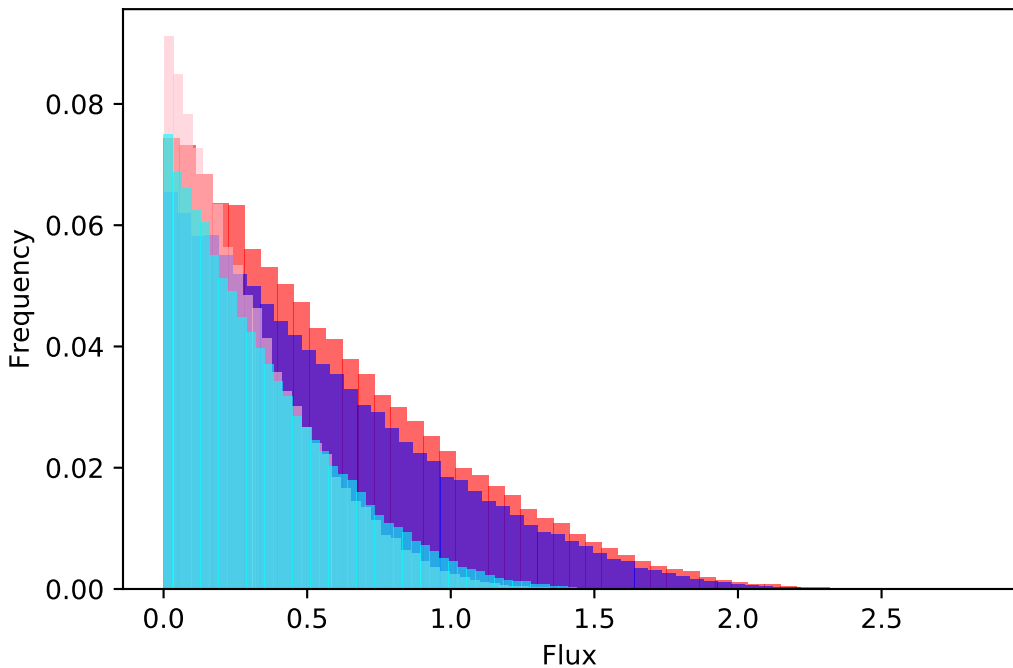
45 : ATP_c + Frc_c --> ADP_c + F6P_c + H_c
['AT3G59480', 'AT2G19860', 'AT2G31390', 'AT3G54090']
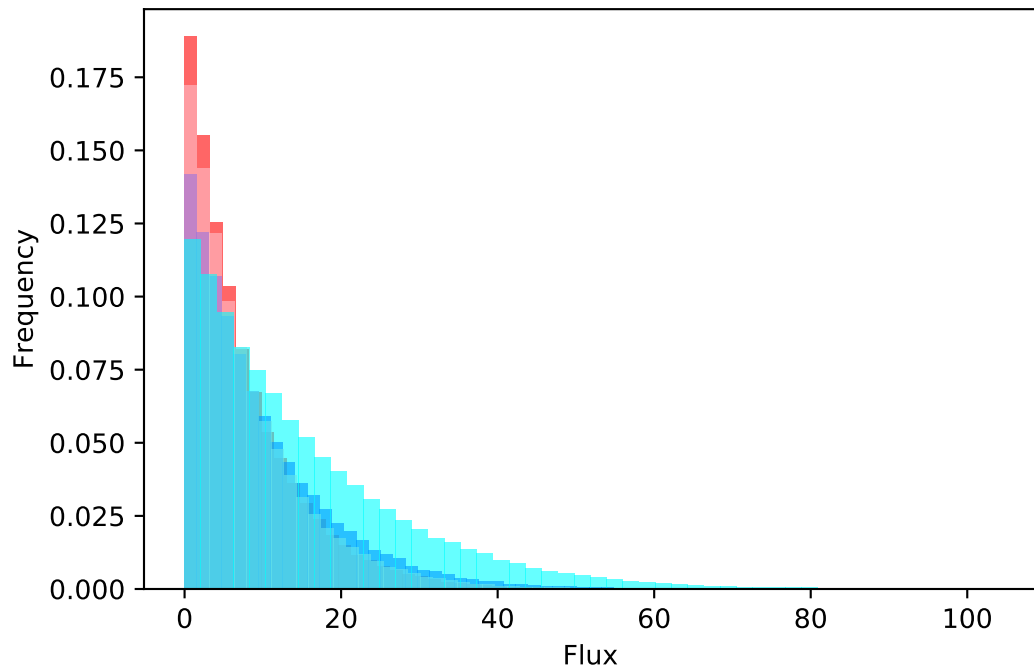
46 : G6P_c + UDPG_c --> T6P_c + UDP_c
['AT1G16980', 'AT2G18700', 'AT1G17000', 'AT1G78580', 'AT1G60140', 'AT1G06410']
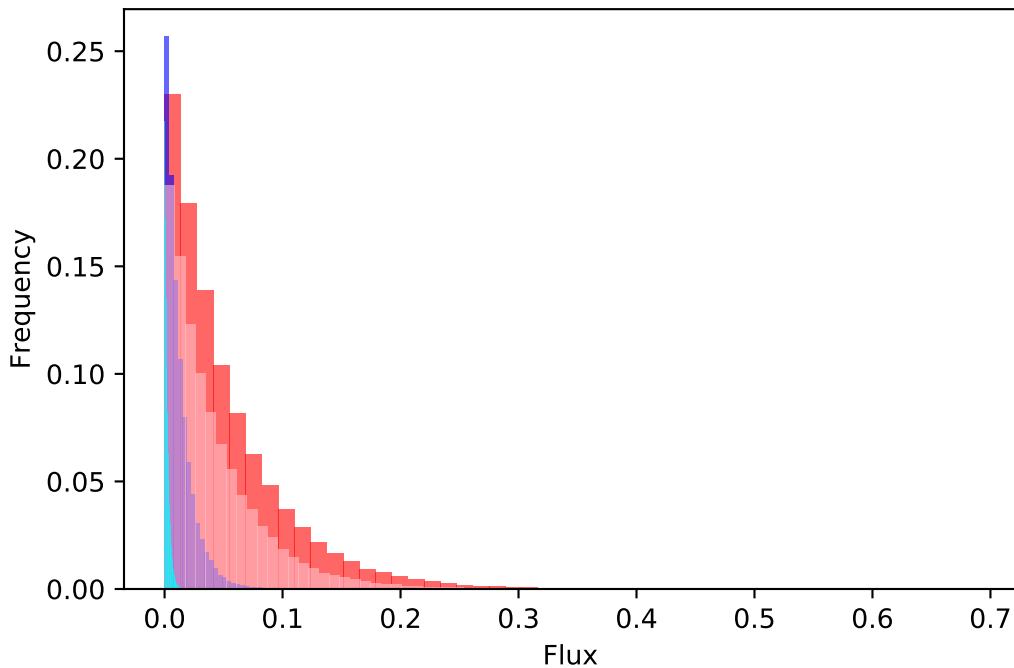
47 : H2O_c + T6P_c --> Pi_c + Tre_c
['AT2G22190', 'AT1G35910', 'AT4G22590', 'AT4G39770', 'AT4G12430', 'AT1G22210', 'AT5G65140']
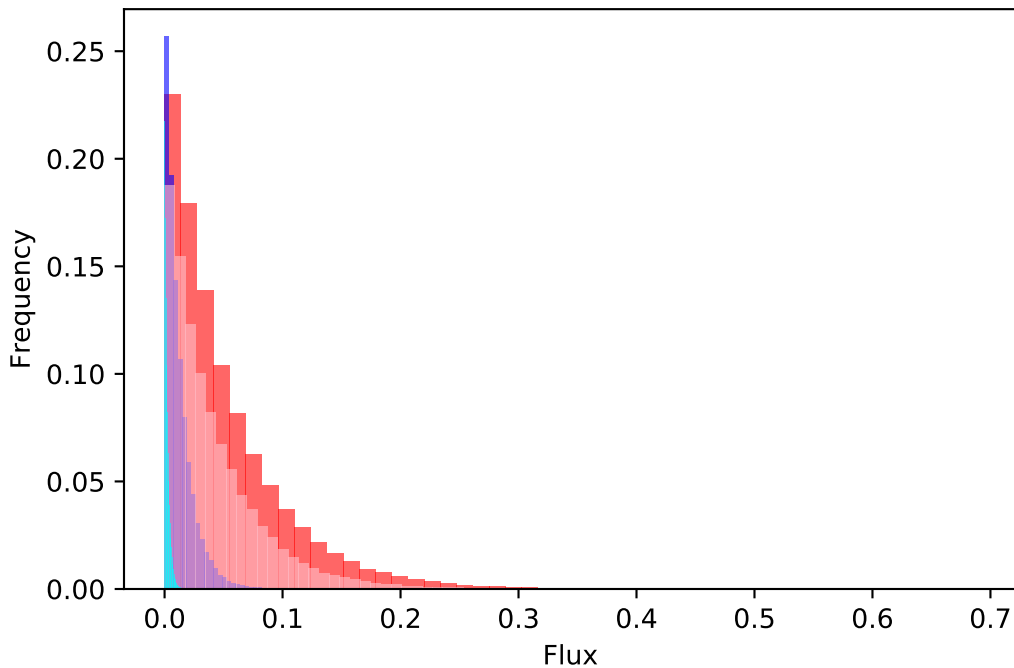
48 : H2O_c + UDPG_c --> UDP_c + cellulose1_c
['AT5G44030', 'AT4G39350', 'AT2G25540', 'AT5G64740', 'AT5G09870', 'AT5G05170', 'AT5G17420', 'AT4G32410', 'AT4G18780', 'AT2G21770'
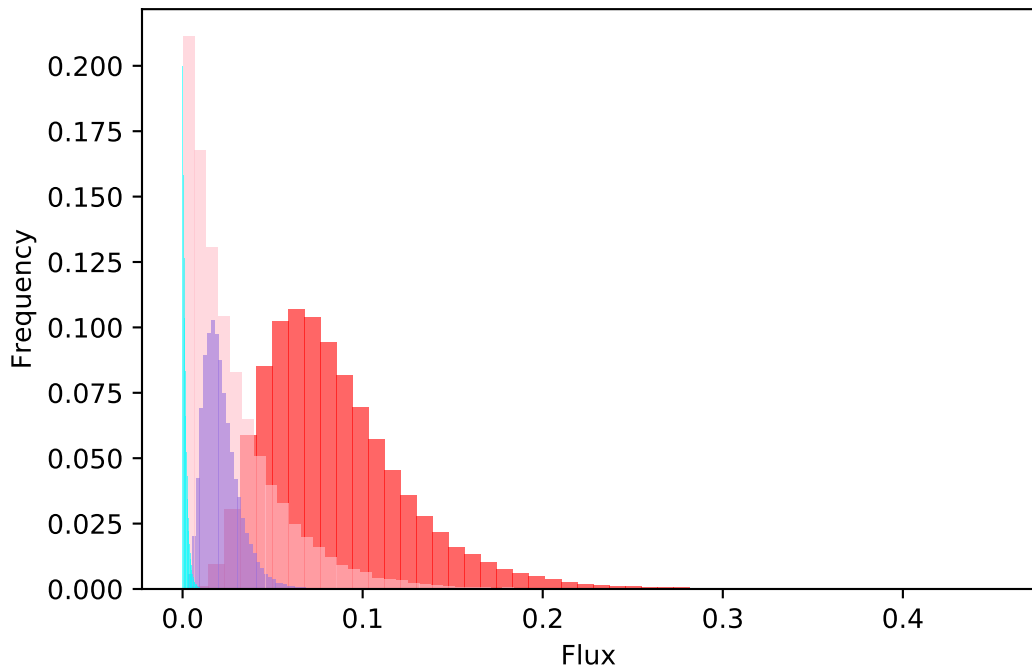
49 : UDPG_c + cellulose1_c --> UDP_c + cellulose2_c
['AT5G44030', 'AT4G39350', 'AT2G25540', 'AT5G64740', 'AT5G05170', 'AT5G09870', 'AT5G17420', 'AT4G32410', 'AT4G18780', 'AT2G21770'
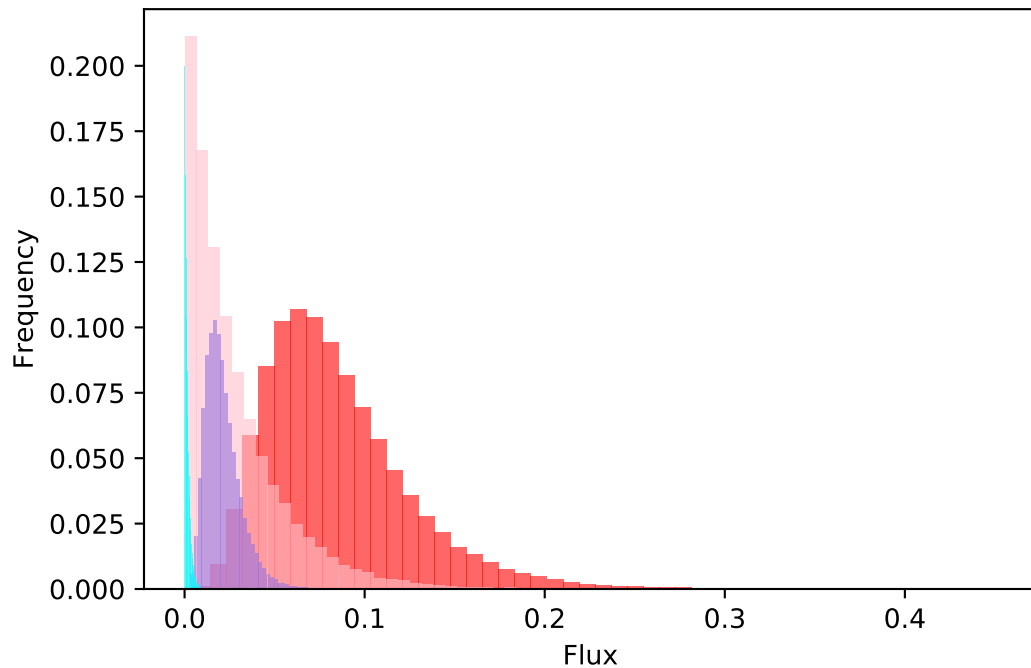
50 : UDPG_c + cellulose2_c --> UDP_c + cellulose3_c
['AT5G44030', 'AT4G39350', 'AT5G17420', 'AT5G64740', 'AT5G09870', 'AT5G05170', 'AT2G25540', 'AT4G32410', 'AT4G18780', 'AT2G21770'
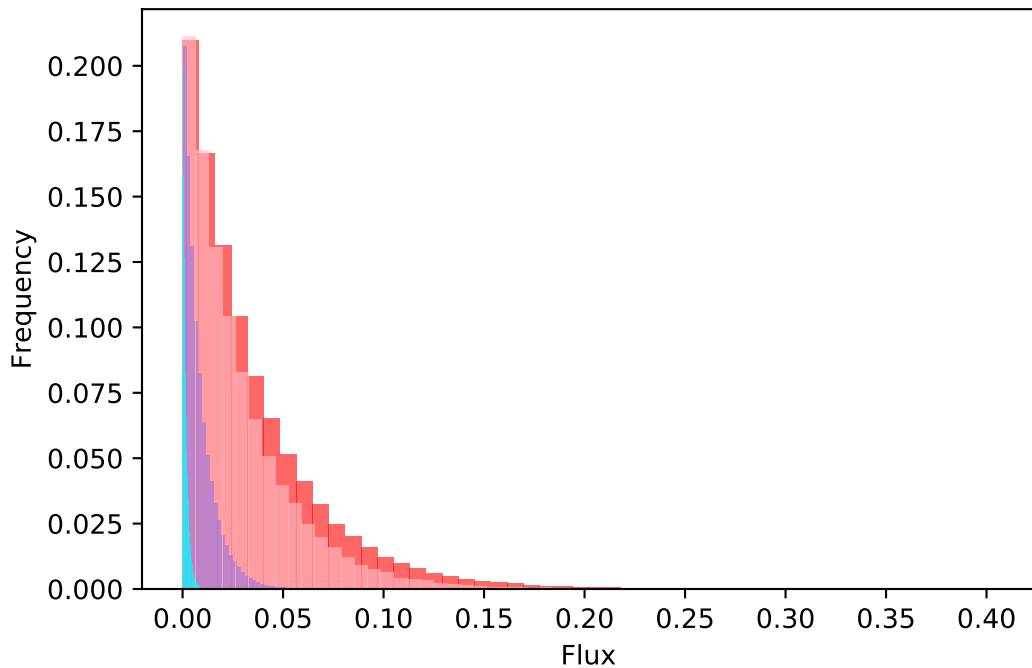
51 : Mal_c + NAD_c <=> NADH_c + OAA_c
['AT5G09660', 'AT5G56720', 'AT5G43330', 'AT2G22780']
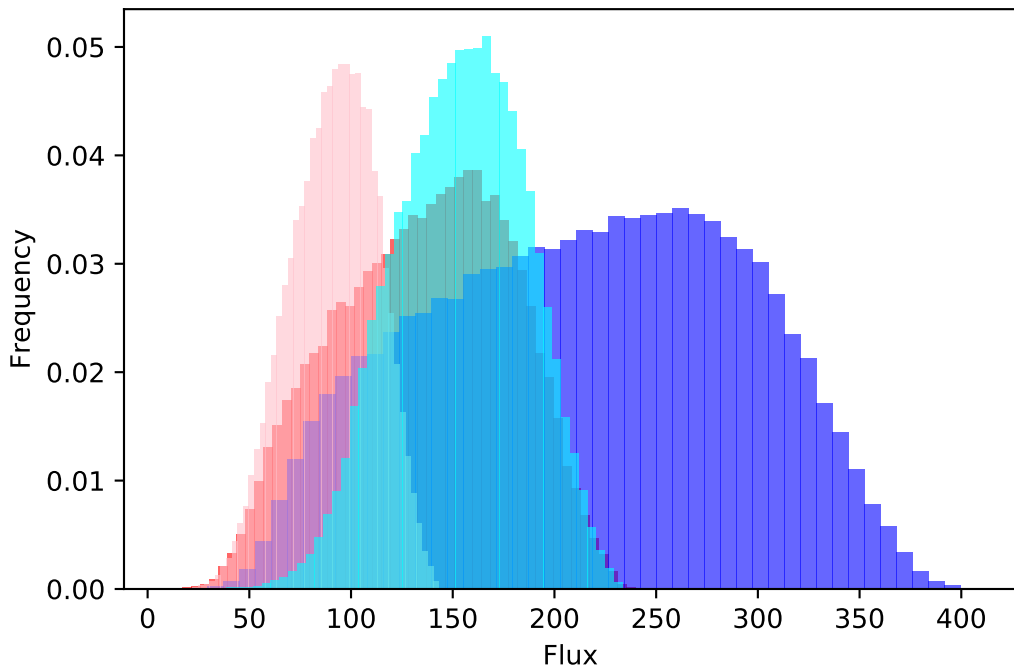
52 : ATP_c + OAA_c --> ADP_c + CO2_c + PEP_c
['AT4G37870', 'AT5G65690']
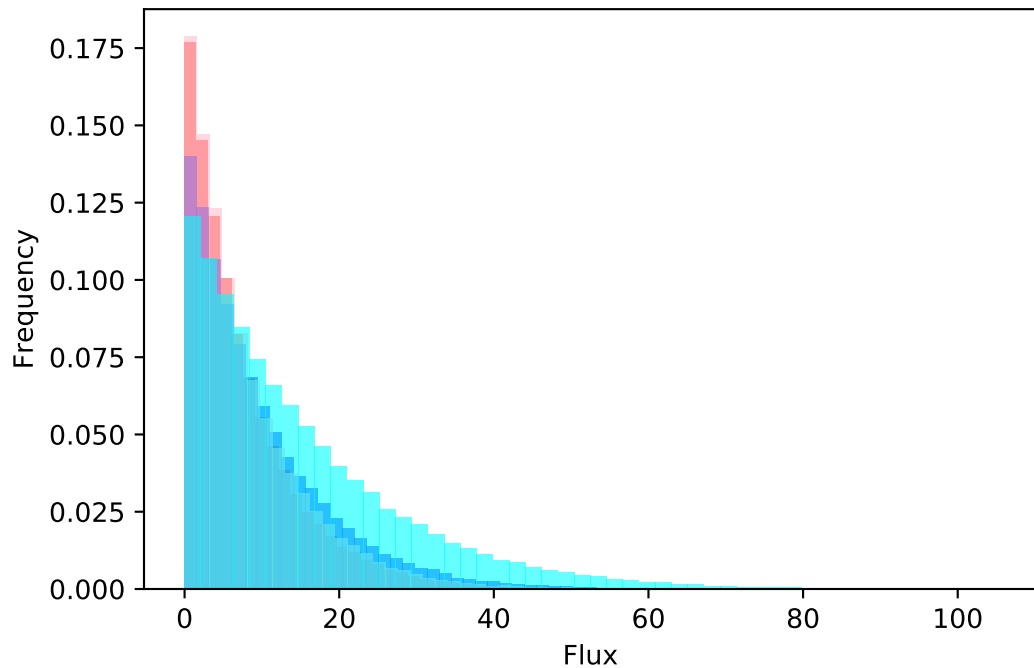
53 : OAA_c + Pi_c <=> HCO3_c + PEP_c
['AT2G42600', '4*AT1G53310', 'AT1G68750', 'AT3G14940']
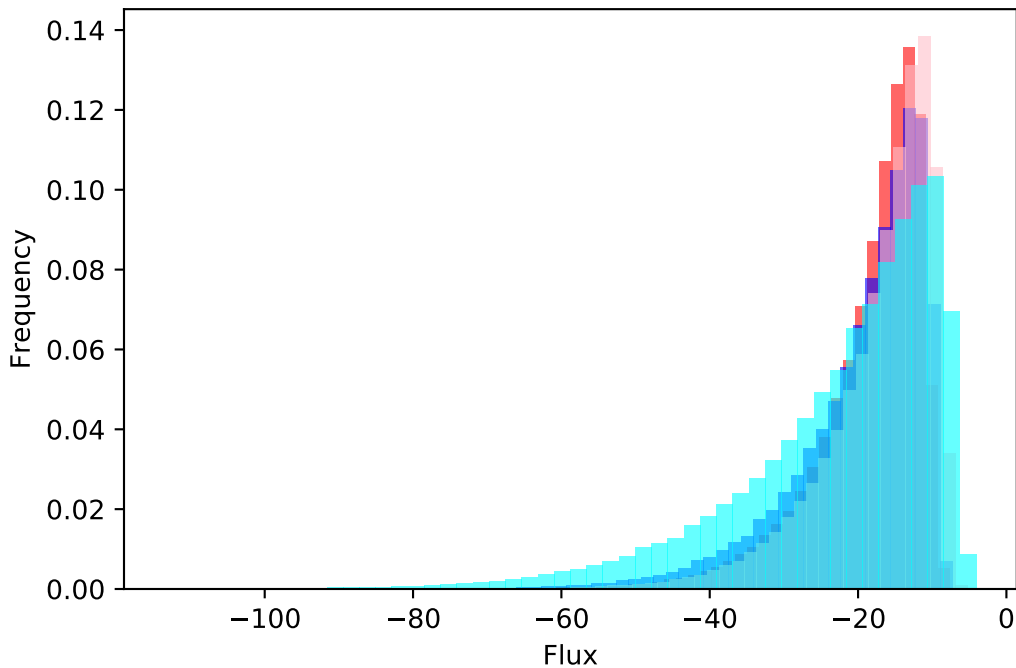
54 : H2O_c + PEP_c <=> 2PGA_c
['AT2G36530', '2*AT2G29560']
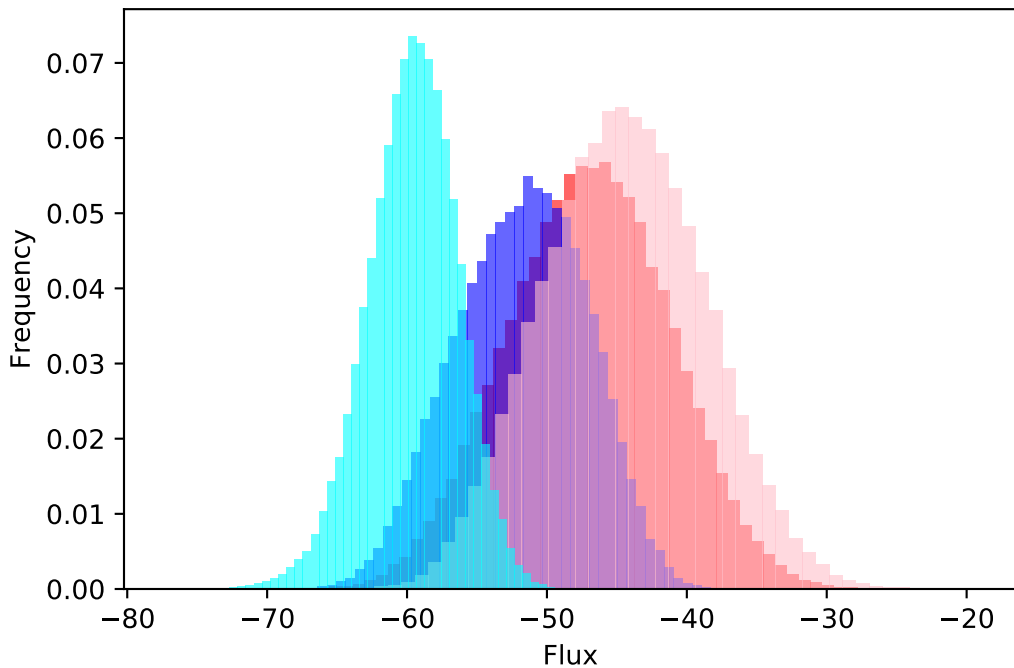
55 : 2PGA_c <=> PGA_c
['AT1G09780', 'AT3G50520', 'AT5G04120', 'AT3G08590']
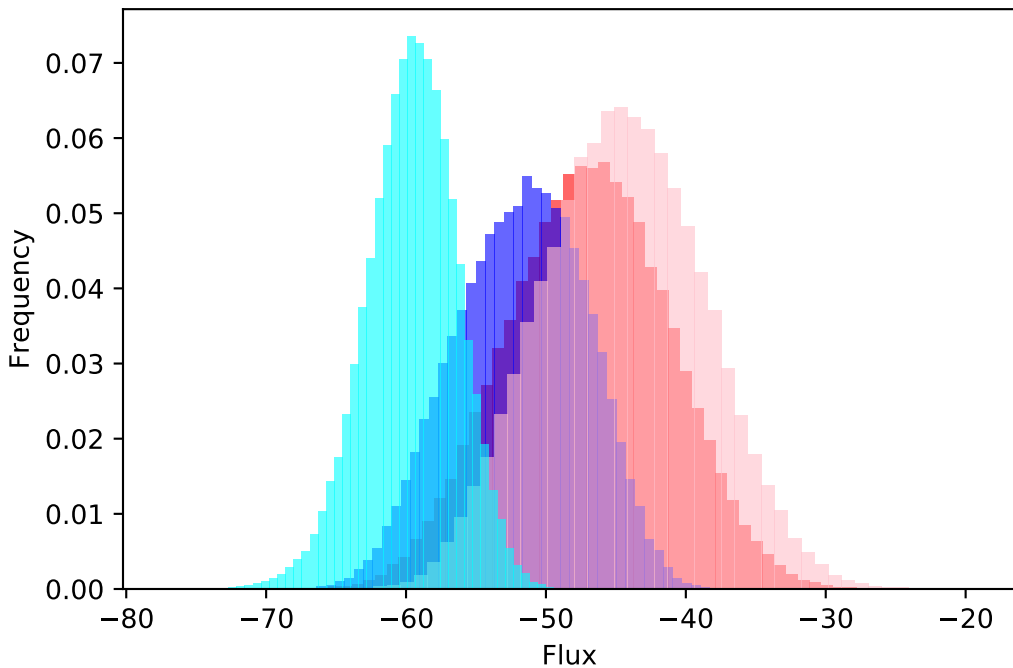
56 : ATP_c + PGA_c <=> ADP_c + DPGA_c
['AT3G12780', 'AT1G79550']
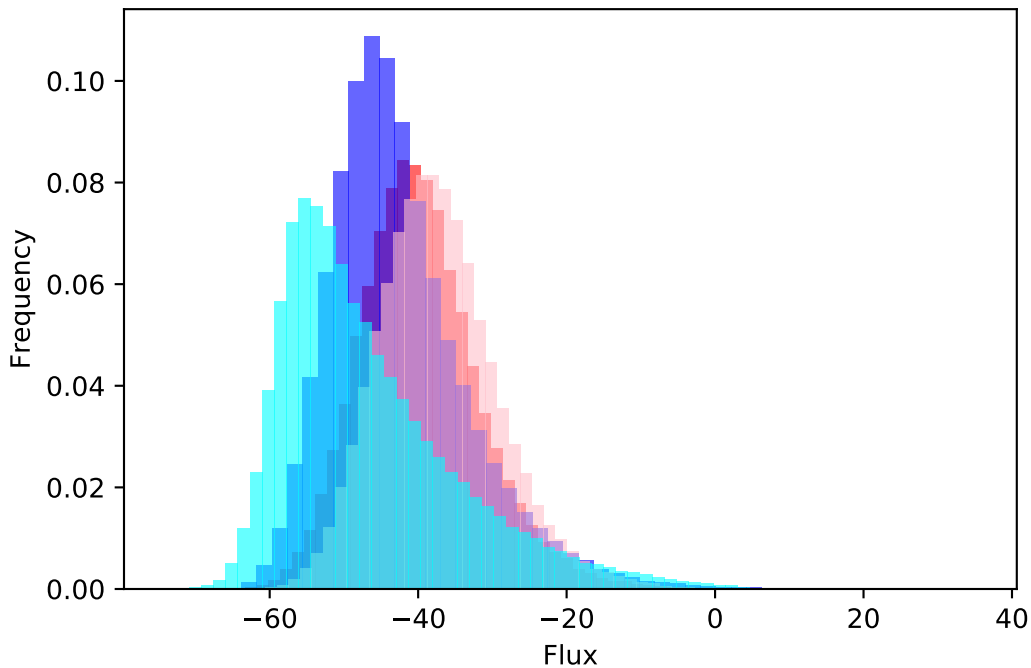
57 : GAP_c + NAD_c + Pi_c <=> DPGA_c + NADH_c
['AT1G13440', '4*AT3G04120']
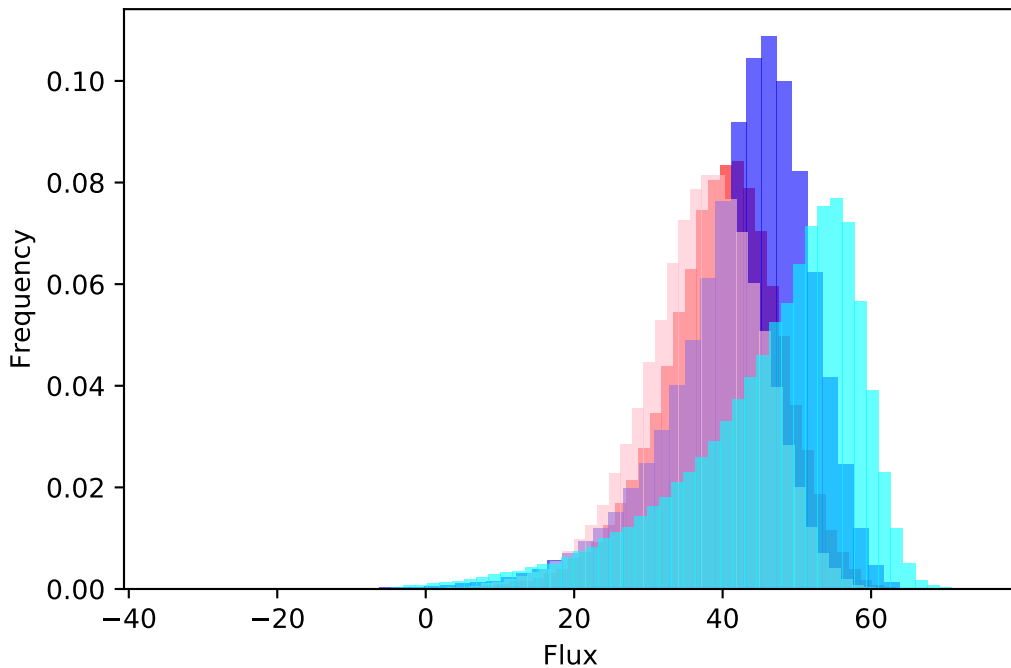
58 : GAP_c + H2O_c + NADP_c --> H_c + NADPH_c + PGA_c
['AT2G24270']
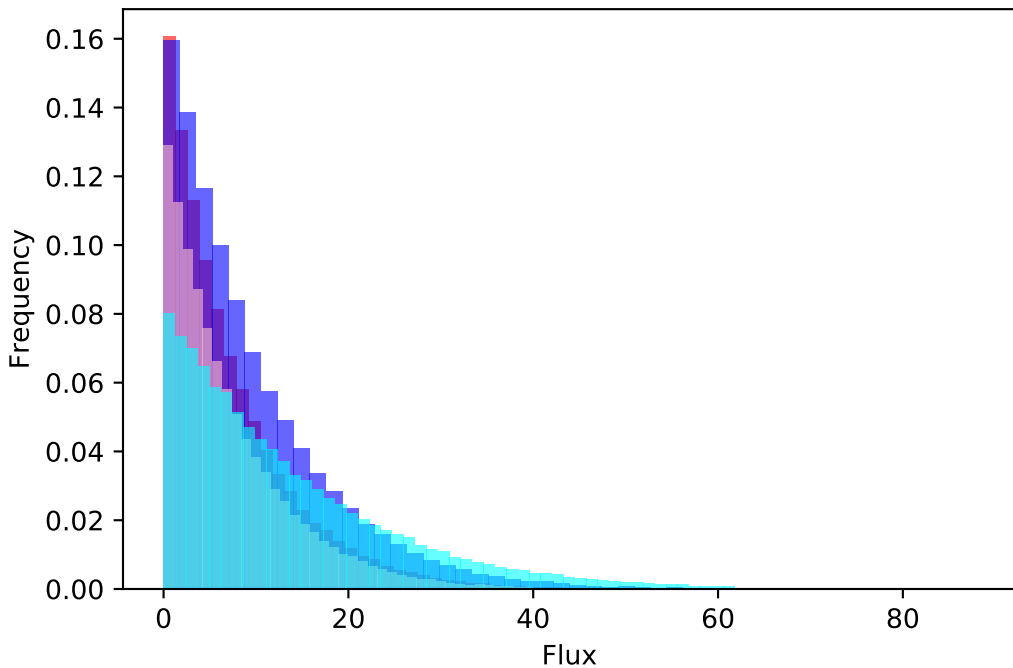
59 : ATP_c + F6P_c --> ADP_c + FBP_c + H_c
['AT4G32840', 'AT5G47810', 'AT5G56630', 'AT4G29220', 'AT4G26270']
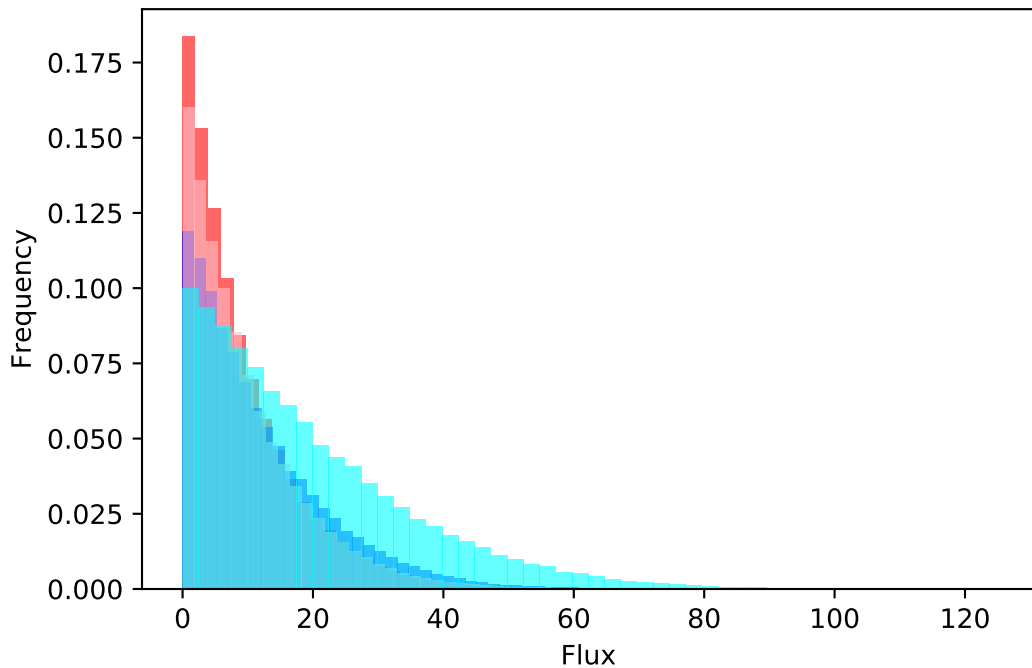
60 : ATP_h + F6P_h --> ADP_h + FBP_h + H_h
['AT5G61580', 'AT2G22480']
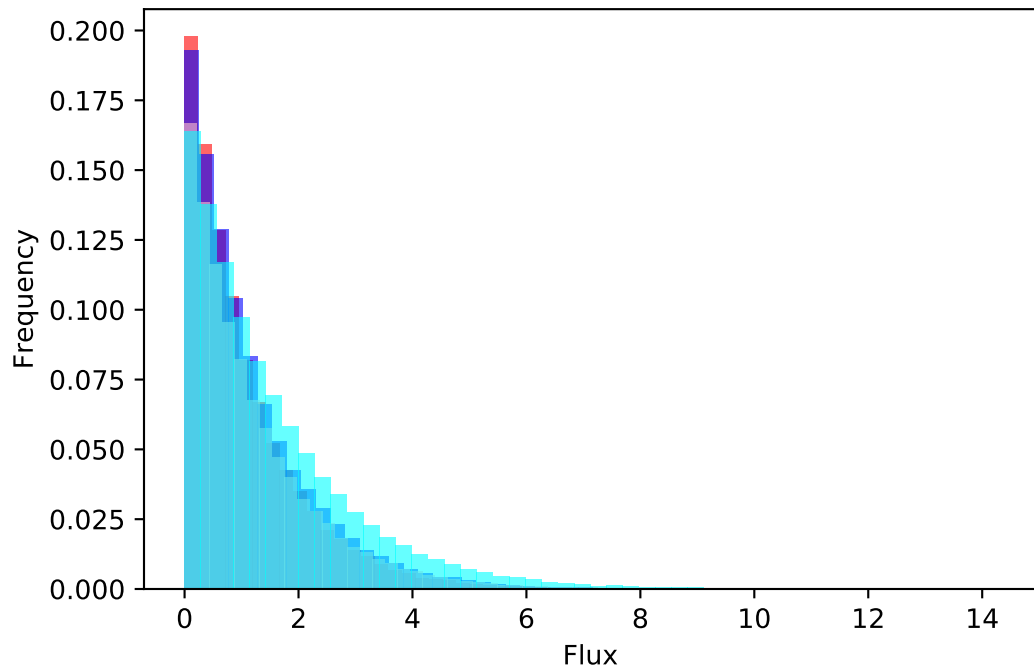
61 : GAP_h + NAD_h + Pi_h <=> DPGA_h + H_h + NADH_h
['4*AT1G79530', 'AT1G16300']
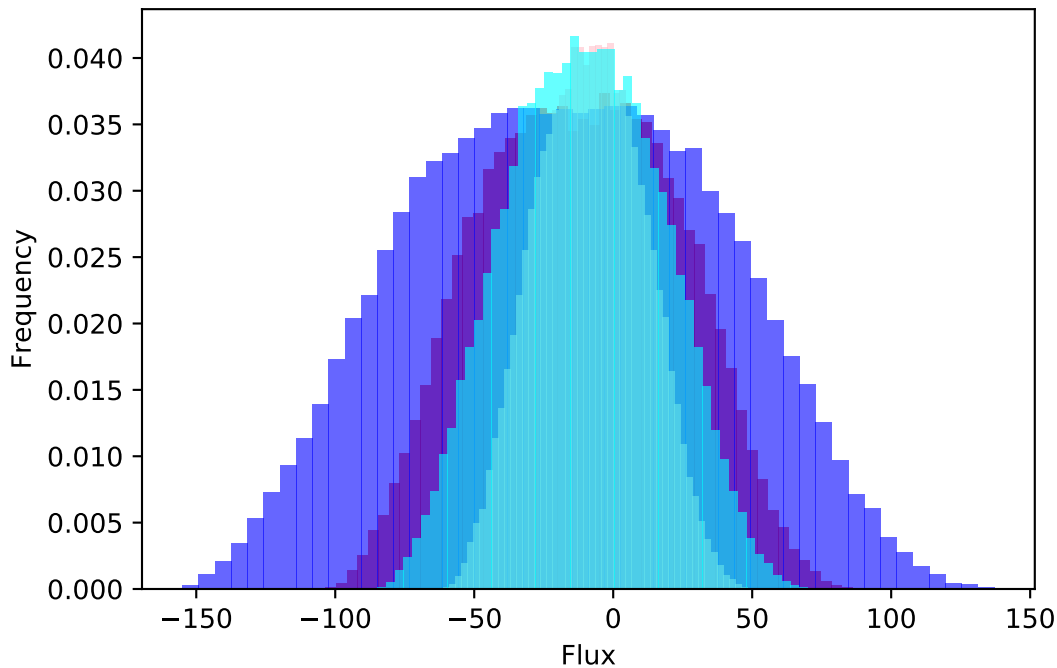
62 : PGA_h <=> 2PGA_h
['AT1G09780', 'AT1G78050', 'AT1G22170']
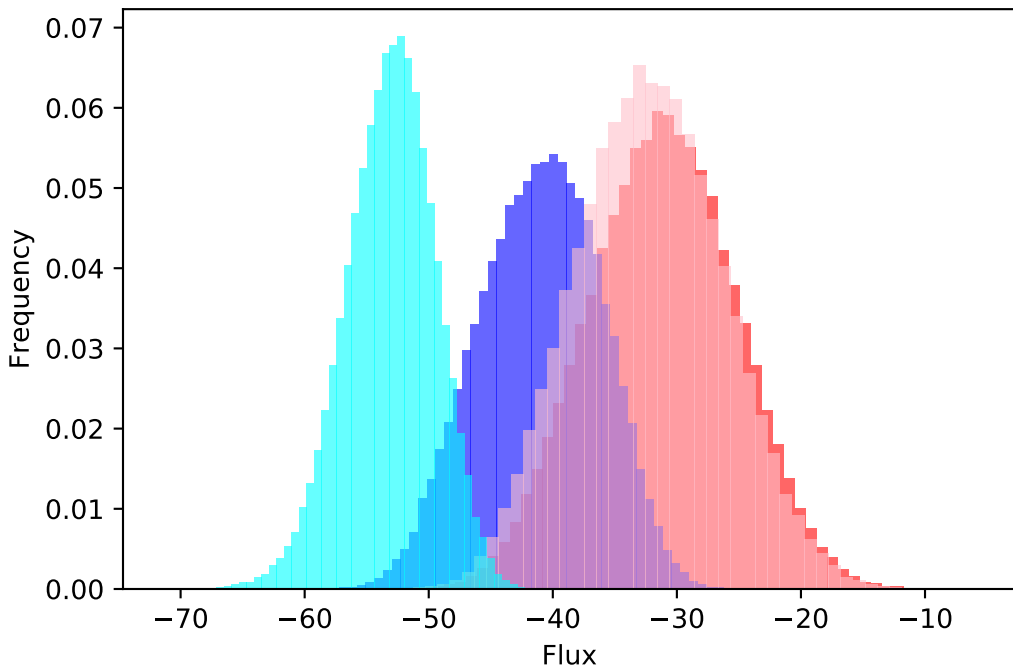
63 : 2PGA_h <=> H2O_h + PEP_h
['AT2G36530', '2*AT1G74030']
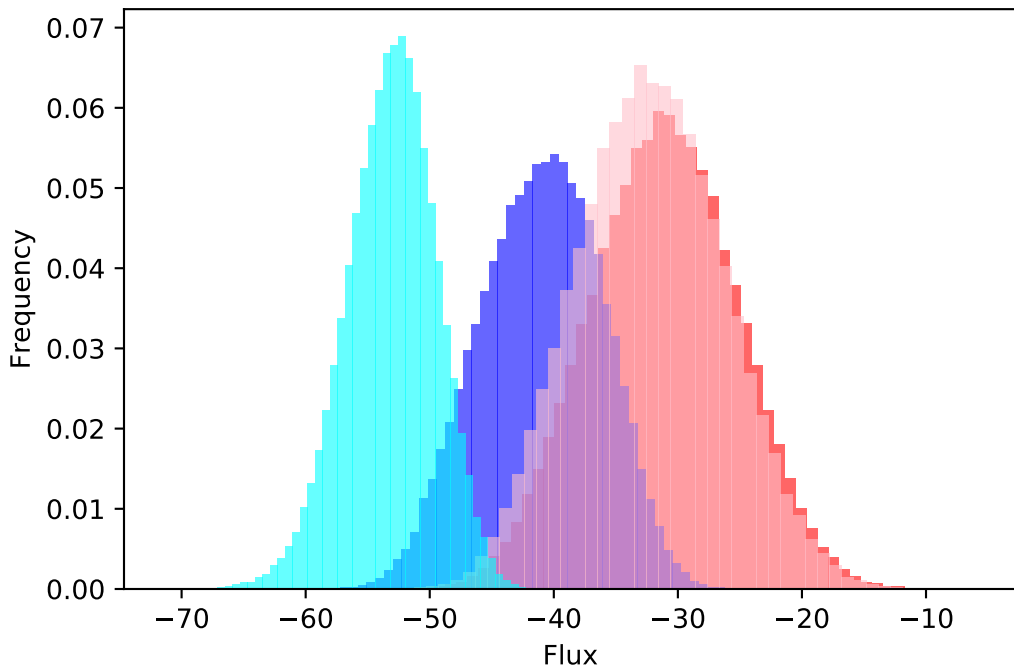
64 : ADP_c + H_c + PEP_c --> ATP_c + Pyr_c
['AT3G25960', 'AT3G55650', 'AT5G08570', 'AT3G52990', 'AT3G55810', 'AT2G36580', '4*AT3G04050', 'AT5G63680']
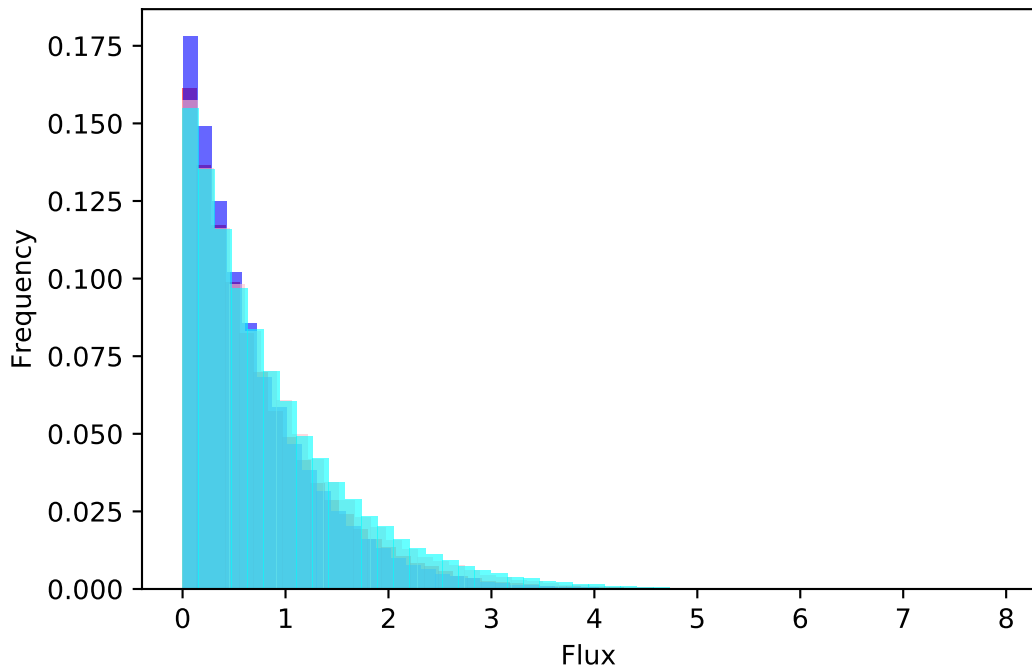
65 : ADP_h + H_h + PEP_h --> ATP_h + Pyr_h
['AT1G32440', '4*AT5G52920', '4*AT3G22960']
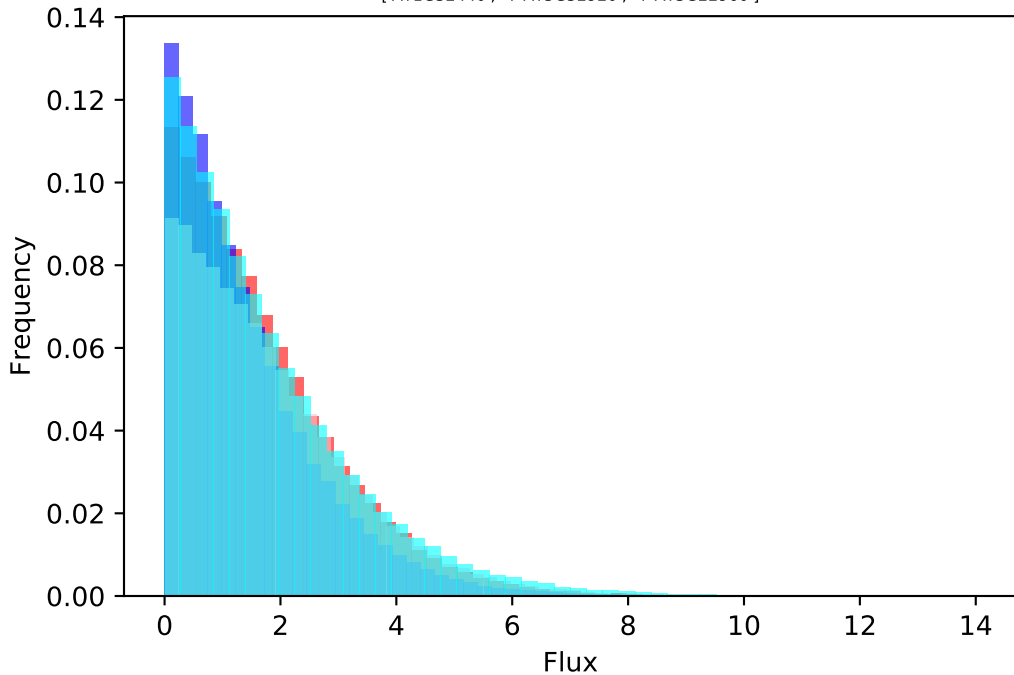
66 : H_m + Pyr_m + ThPP_m --> CO2_m + H_DASH_Eth_DASH_ThPP_m
['2*AT5G50850', '2*AT1G59900']
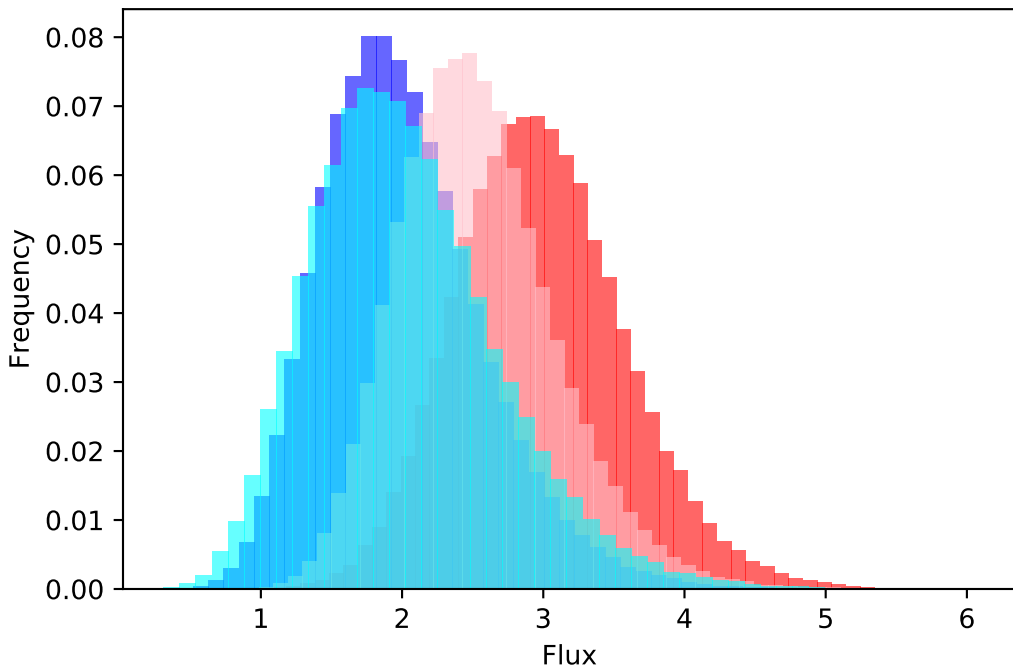
67 : H_DASH_Eth_DASH_ThPP_m + LPA_m --> A_DASH_DHL_m + ThPP_m
['2*AT5G50850', '2*AT1G59900']
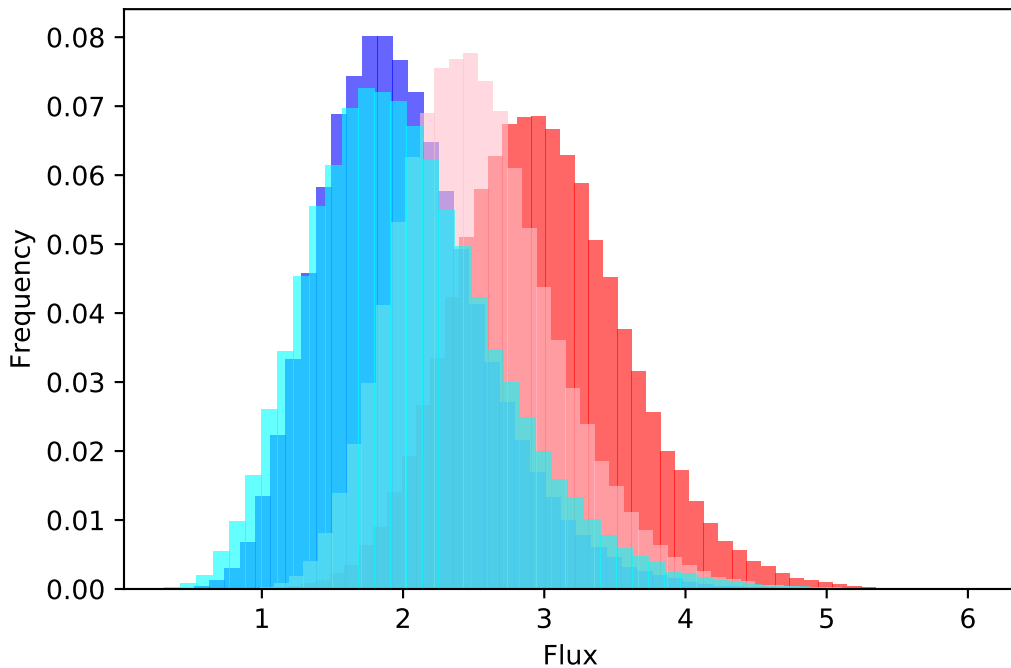
68 : A_DASH_DHL_m + CoA_m --> A_DASH_CoA_m + DHL_m
['AT1G54220', '3*AT3G52200', 'AT3G13930']
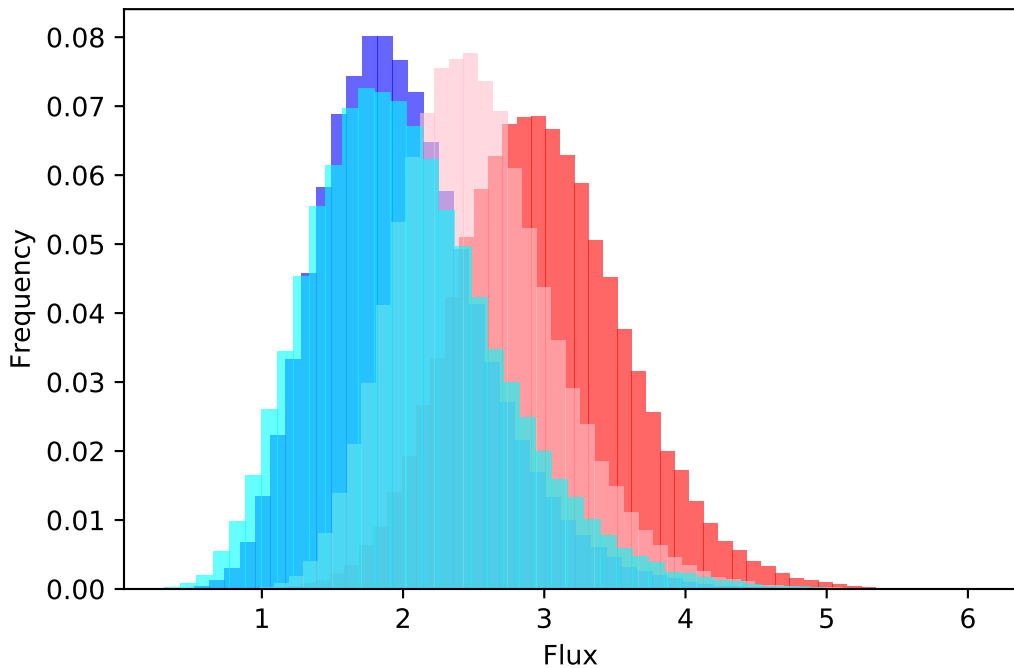
69 : DHL_m + NAD_m --> H_m + LPA_m + NADH_m
['2*AT1G48030', 'AT3G17240']
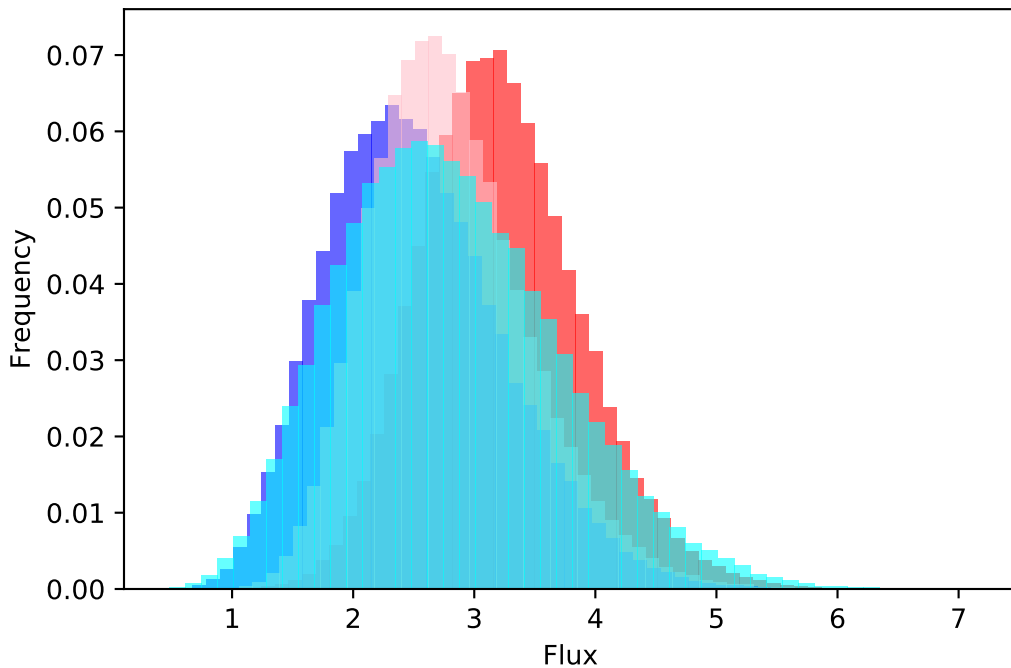
70 : A_DASH_CoA_m + H2O_m + OAA_m --> Cit_m + CoA_m + H_m
['AT2G44350', 'AT3G60100']
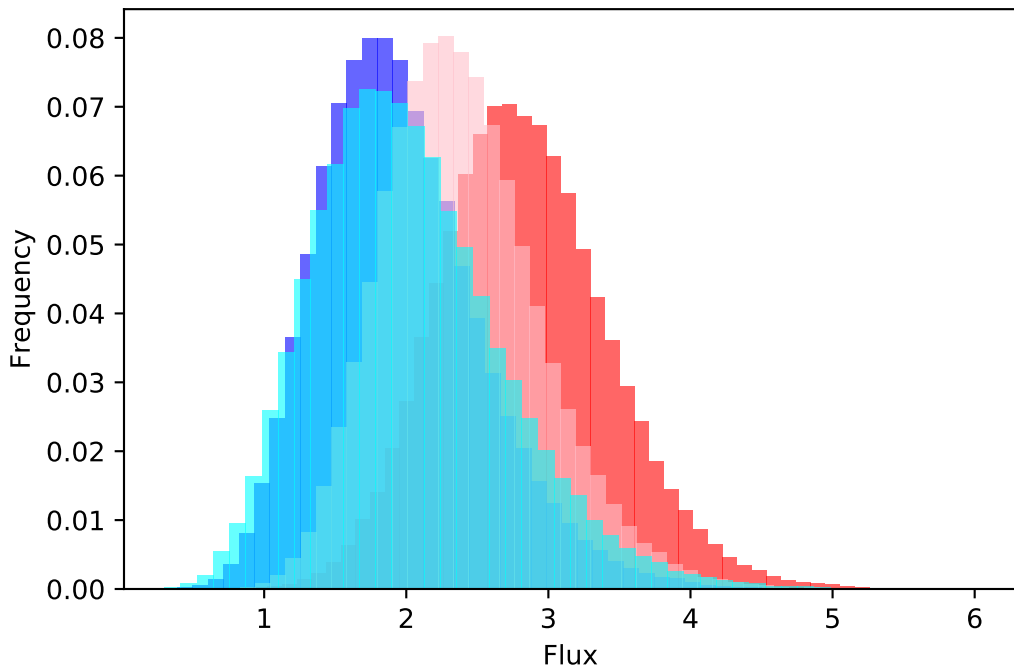
71 : Cit_m --> H2O_m + cACN_m
['AT4G35830', 'AT4G26970', 'AT2G05710']
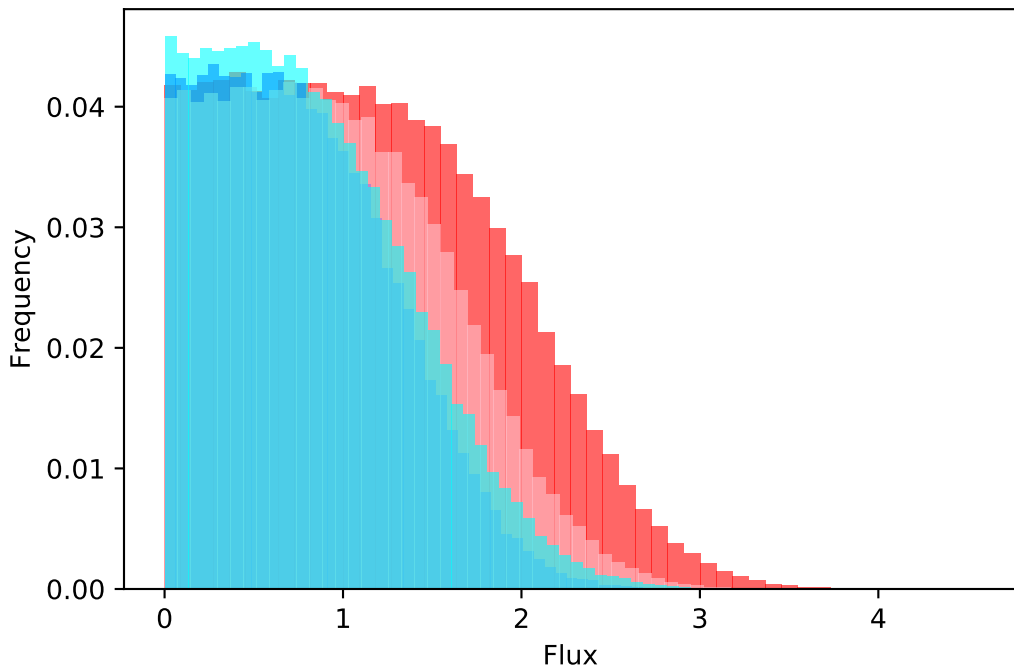
72 : H2O_m + cACN_m --> iCit_m
['AT4G35830', 'AT4G26970', 'AT2G05710']
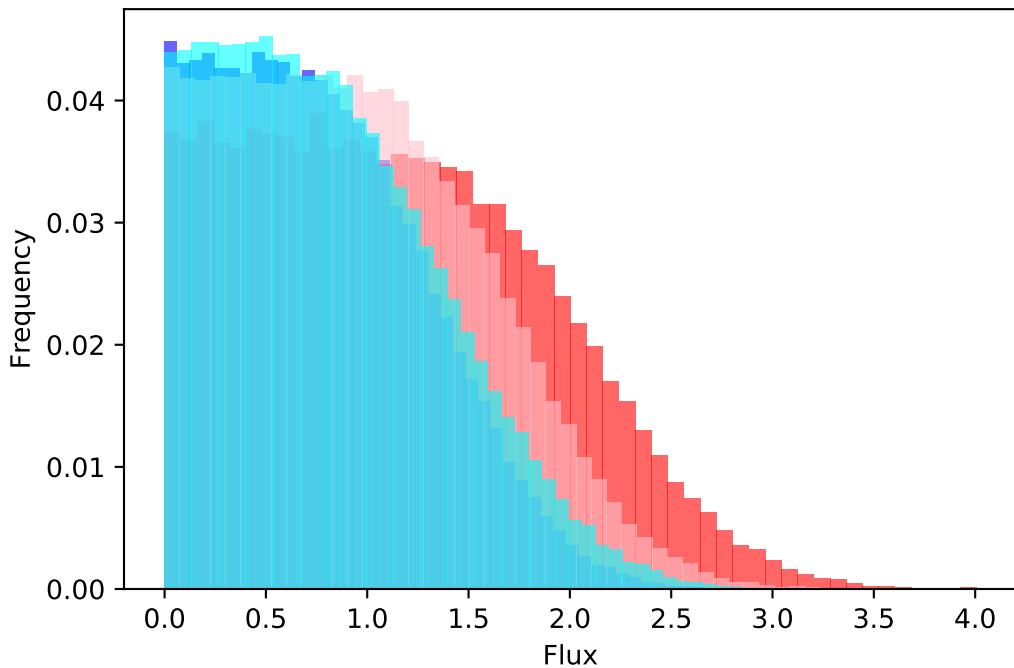
73 : NAD_m + iCit_m --> CO2_m + KG_m + NADH_m
['AT4G35260', 'AT5G03290', 'AT2G17130', 'AT3G09810', 'AT4G35650']
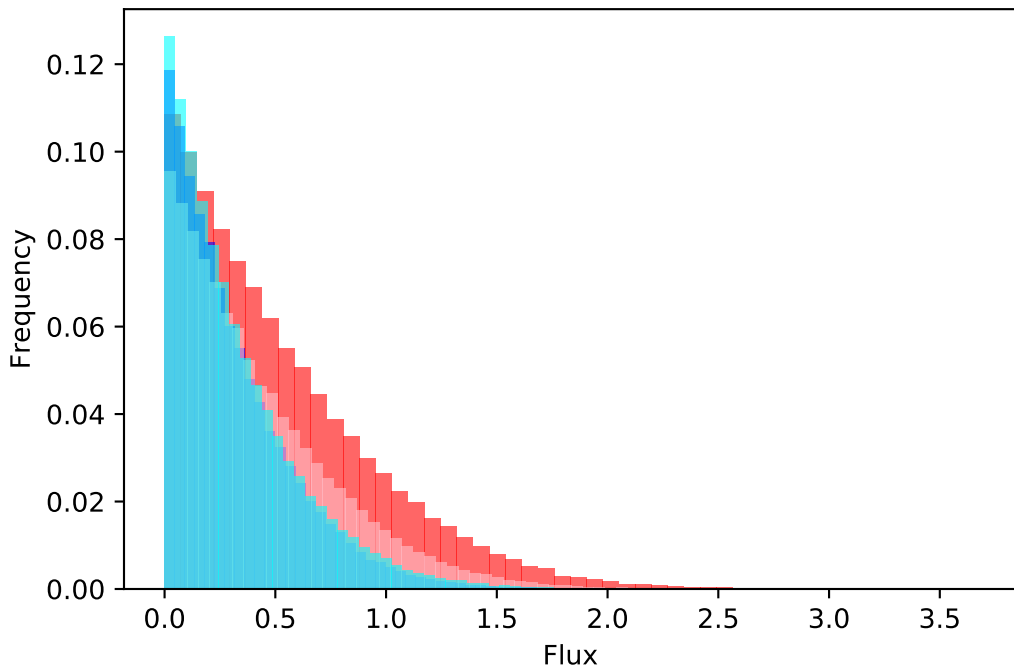
74 : H_m + KG_m + LPA_m --> CO2_m + S_DASH_DHL_m
['2*AT5G65750', 'AT3G55410']
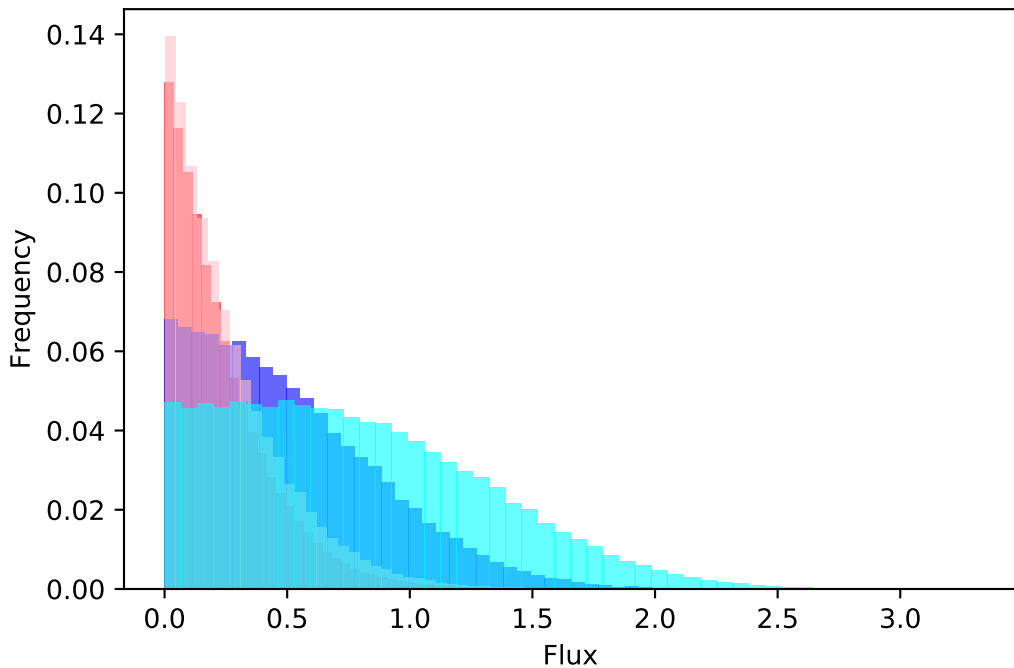
75 : CoA_m + S_DASH_DHL_m --> DHL_m + S_DASH_CoA_m
['3*AT5G55070', 'AT4G26910']
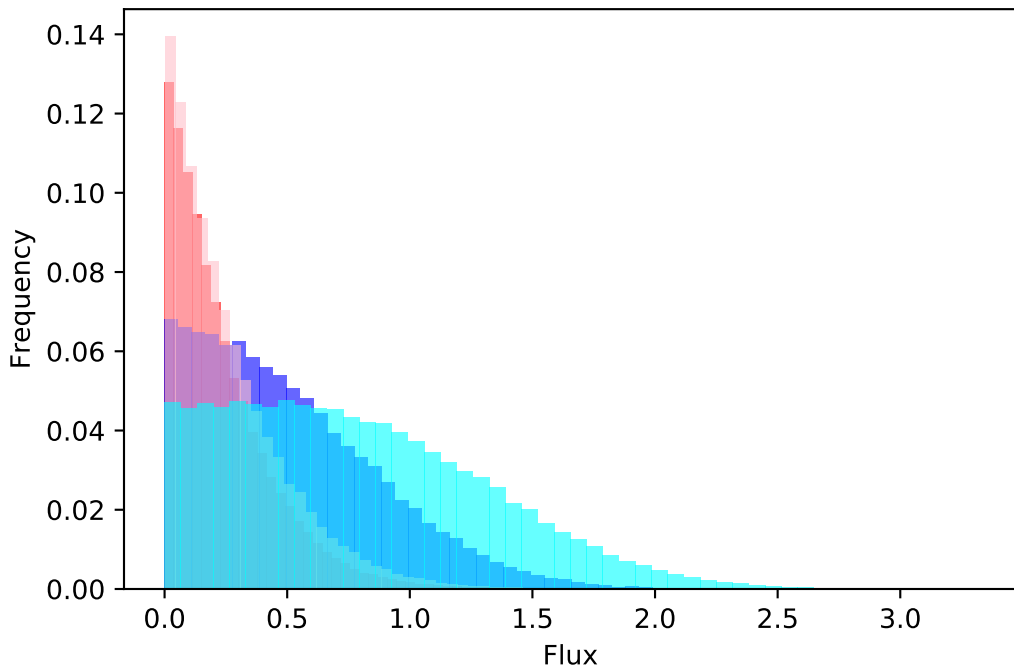
76 : ADP_m + Pi_m + S_DASH_CoA_m --> ATP_m + CoA_m + SCA_m
['AT2G20420', 'AT5G23250', 'AT5G08300']
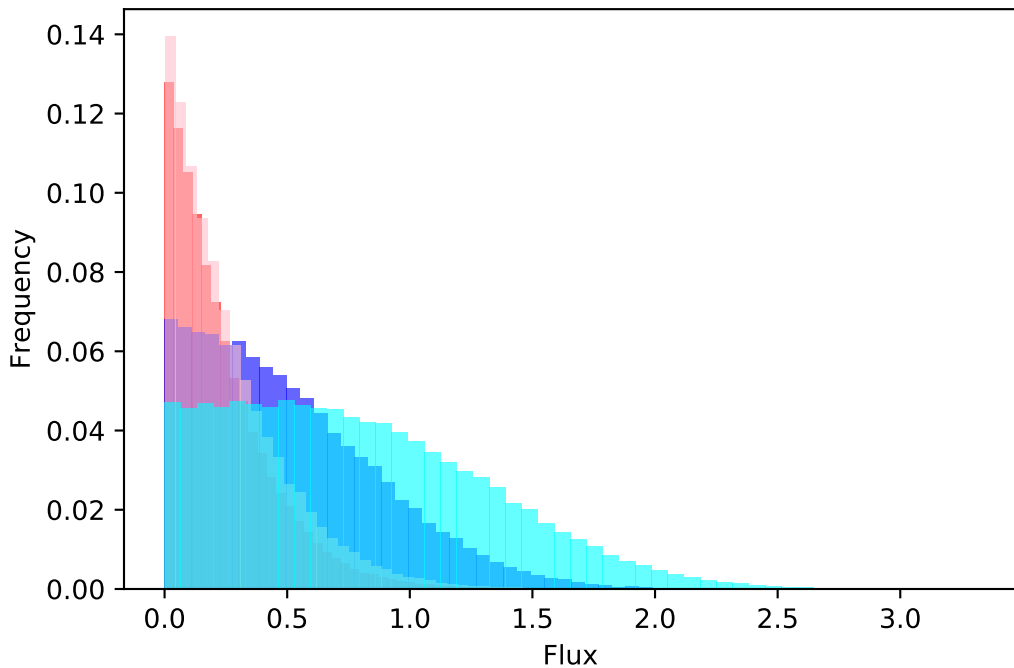
77 : Q_m + SCA_m --> Fum_m + QH2_m

5G65165', 'AT3G27380', 'AT3G47833', 'AT5G09600', 'AT4G32210', 'AT2G18450', 'AT5G66760', 'AT1G47420', 'AT2G46390', 'AT2G46505', 'AT5G
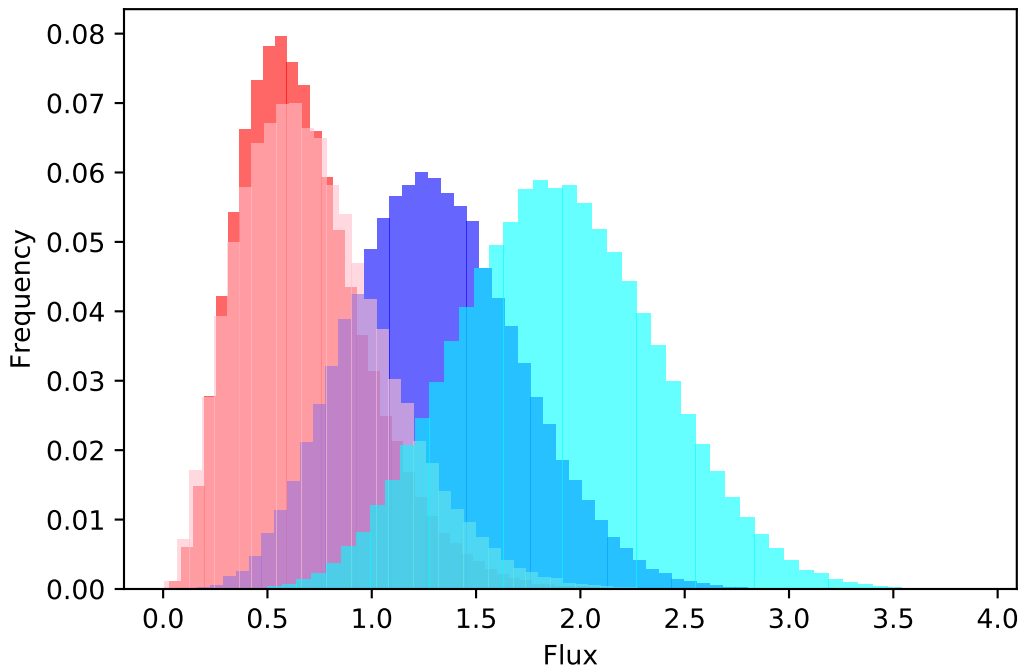
78 : Fum_m + H2O_m --> Mal_m
['AT2G47510', 'AT5G50950']
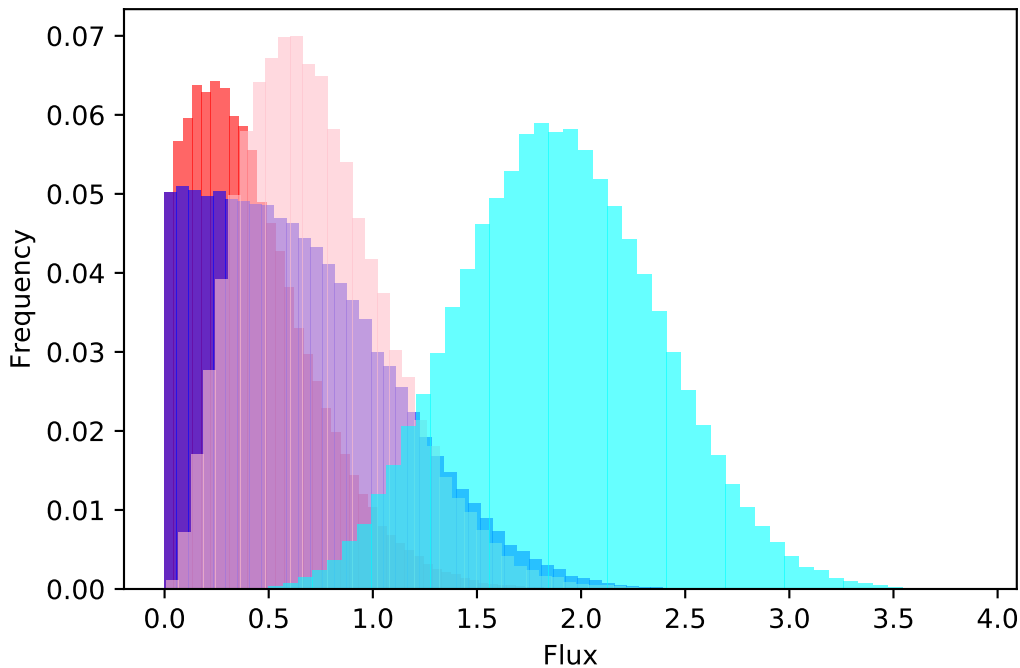
**79 : Mal_m + NAD_m <=> H_m + NADH_m + OAA_m**
**['AT1G53240', 'AT3G47520', 'AT3G15020']**
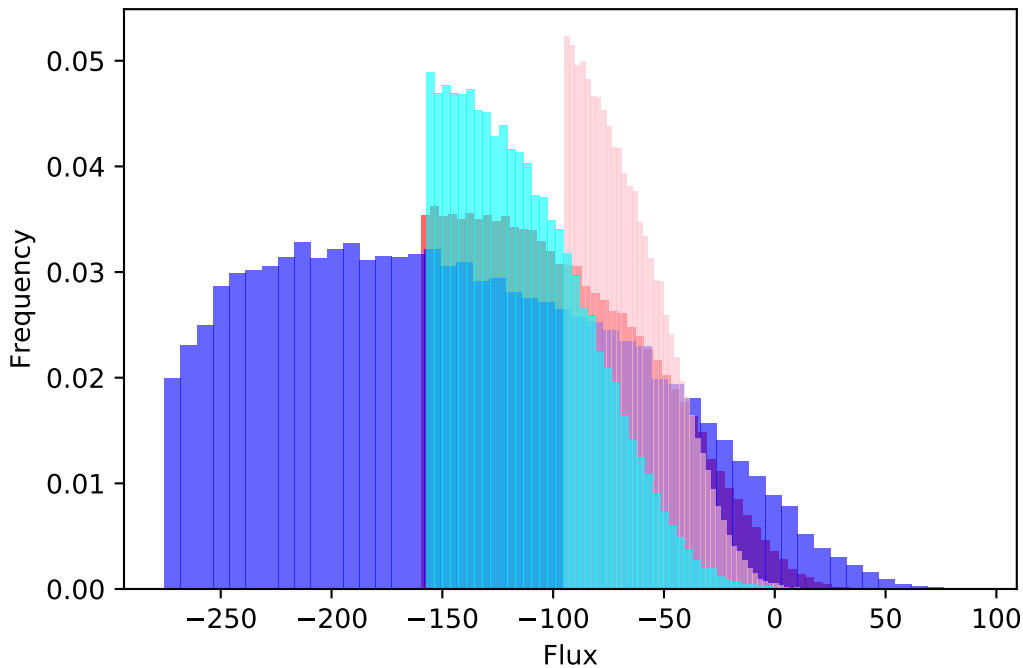
80 : 5.0 H_m + NADH_m + Q_m --> 4.0 H_i + NAD_m + QH2_m

', 'AT5G37510', 'ATMG01275', 'AT1G16700', 'ATMG01120', 'ATMG00513', 'ATMG01320', 'ATMG00060', 'ATMG00510', 'ATMG00580', 'ATMG0065
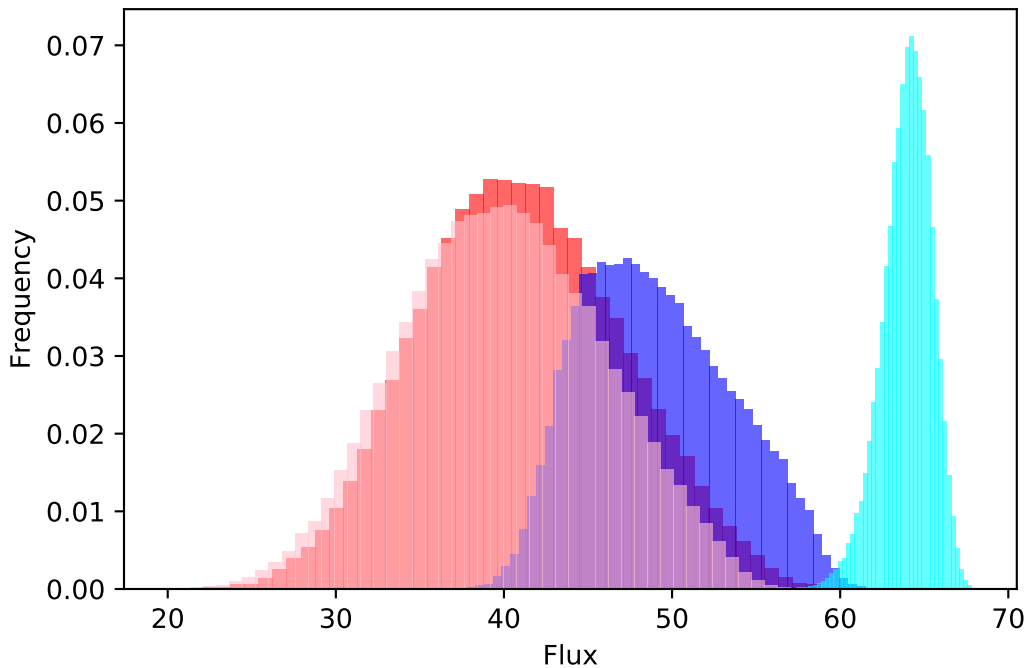
81 : 2.0 Cytcox_m + 2.0 H_m + QH2_m --> 2.0 Cytcrd_m + 4.0 H_i + Q_m

'AT5G25450', 'AT3G02090', 'AT3G10860', 'AT2G07727', 'AT3G52730', 'AT3G16480', 'AT5G13440', 'AT5G40810', 'ATMG00220', 'AT4G32470'
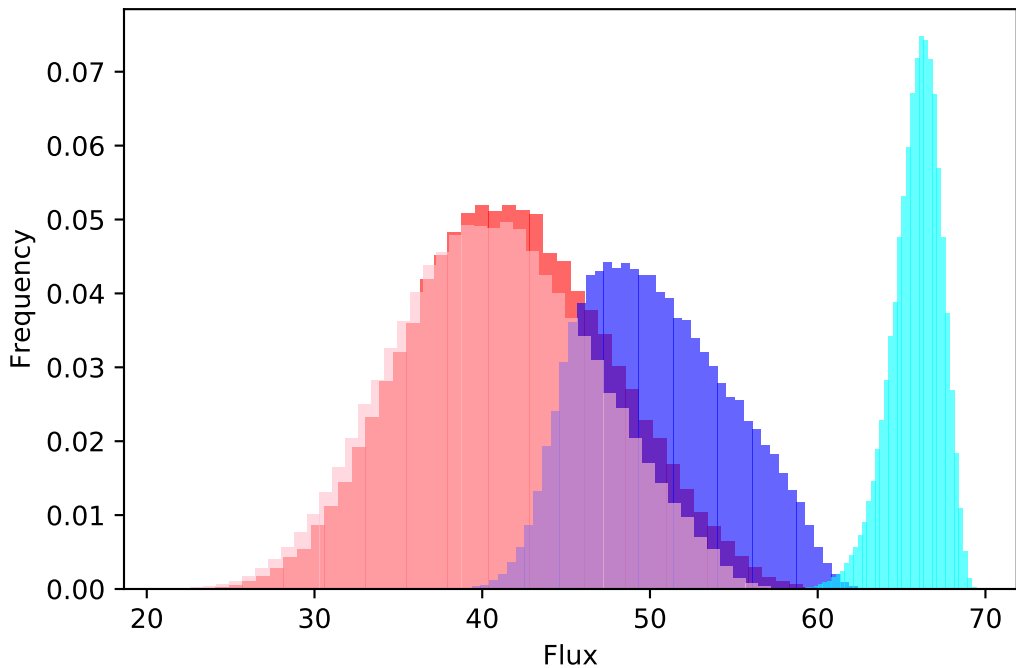
82 : 4.0 Cytcrd_m + 8.0 H_m + O2_m --> 4.0 Cytcox_m + 2.0 H2O_m + 4.0 H_i

0', 'ATMG00730', 'AT3G62400', 'AT1G80230', 'AT5G57815', 'AT5G61310', 'AT4G37380', 'ATMG00160', 'ATMG01360', 'AT3G15640', 'AT1G22450

83 : ADP_m + 4.0 H_i + Pi_m <=> ATP_m + H2O_m + 3.0 H_m

0640', 'AT3G52300', 'AT2G33040', 'AT1G51650', 'AT5G13450', 'AT2G07671', '3*AT5G08670', '12*ATMG01080', 'ATMG01170', 'ATMG00480', '3*
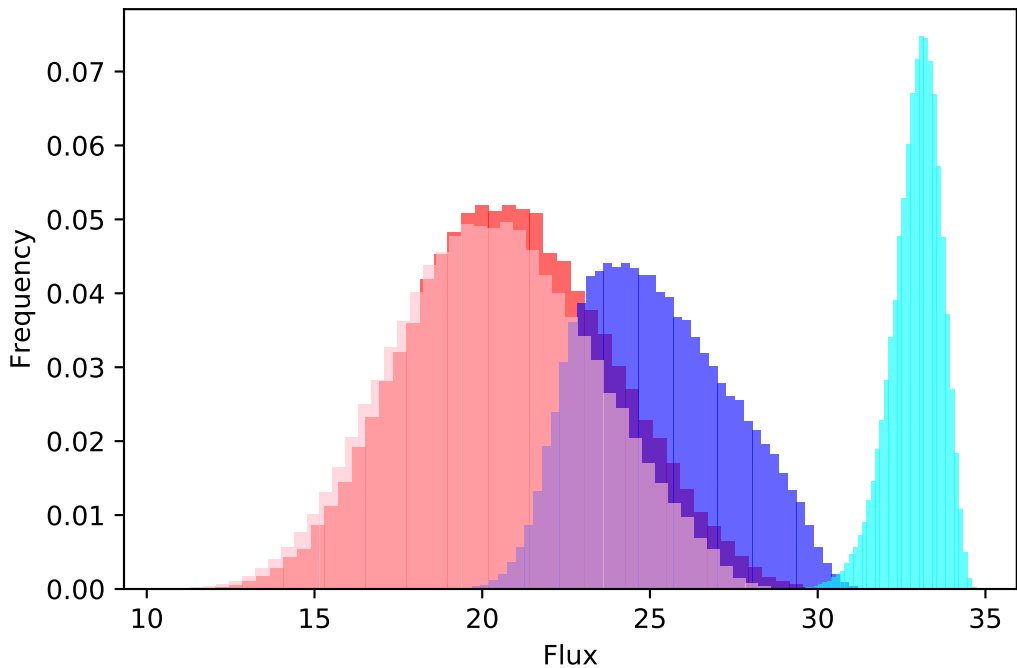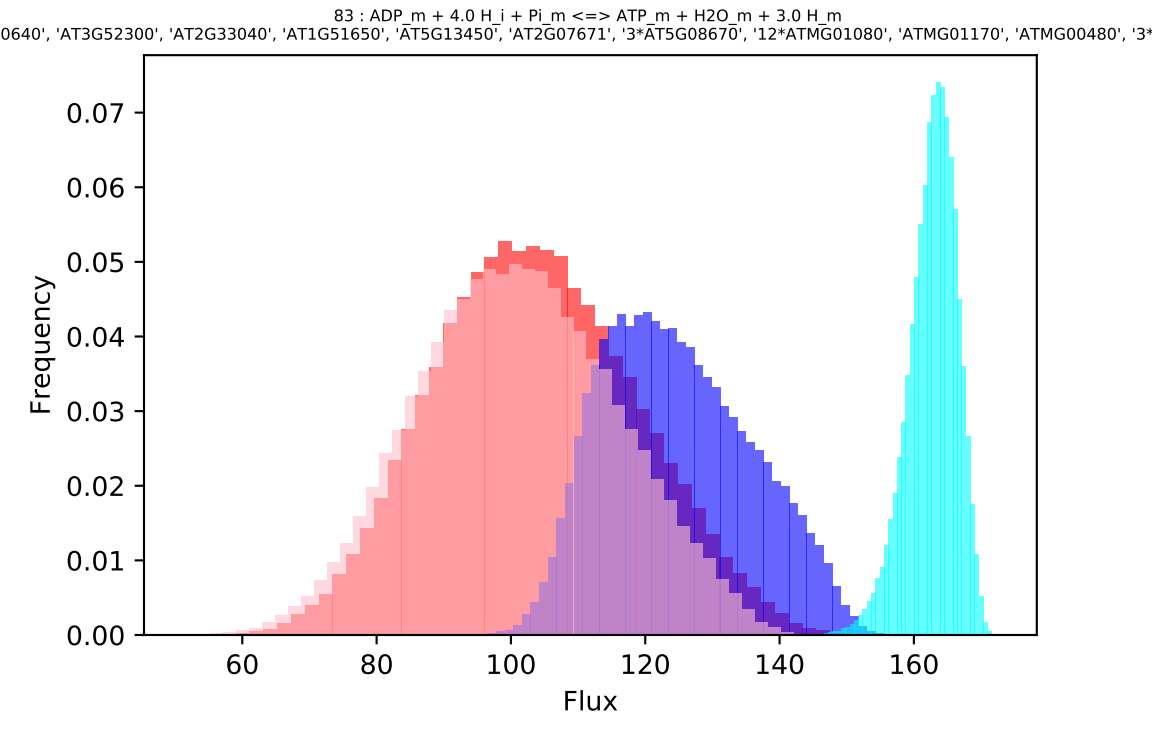
84 : O2_h + RuBP_h --> 2.0 H_h + PGA_h + PGCA_h
['AT1G67090', '8*ATCG00490', 'AT5G38420', '8*AT5G38430', 'AT5G38410']
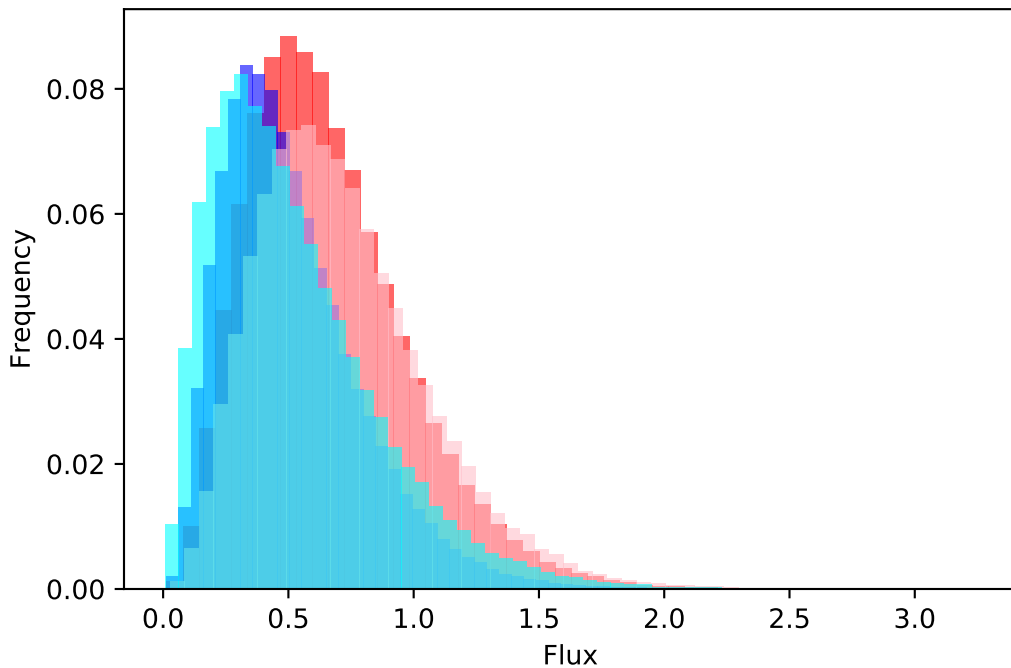
85 : H2O_h + PGCA_h --> GCA_h + Pi_h
['AT5G36700', 'AT5G36790', 'AT5G47760']
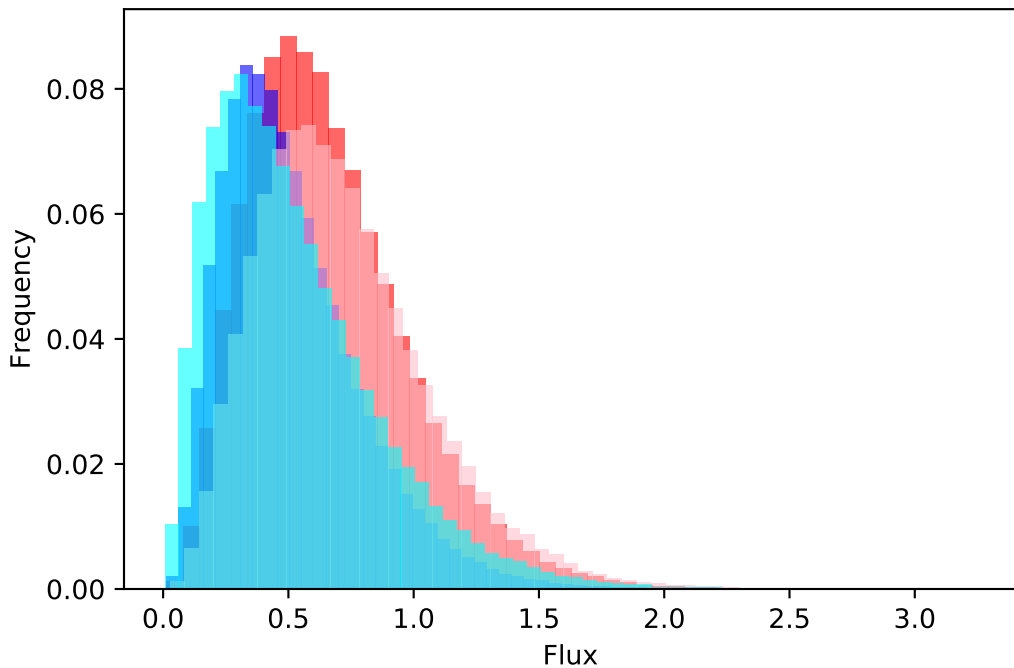
86 : GCA_p + O2_p --> GLX_p + H2O2_p
['AT3G14415', 'AT3G14150', 'AT3G14420', 'AT4G18360']
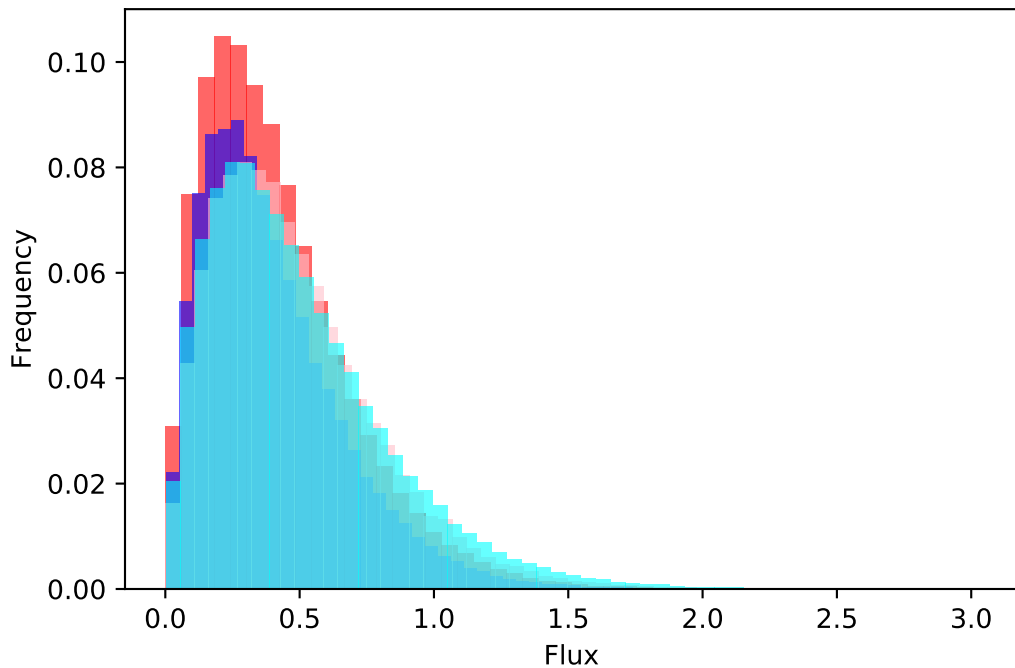
87 : 2.0 H2O2_p --> 2.0 H2O_p + O2_p
['4*AT1G20620', 'AT1G20630', 'AT4G35090']
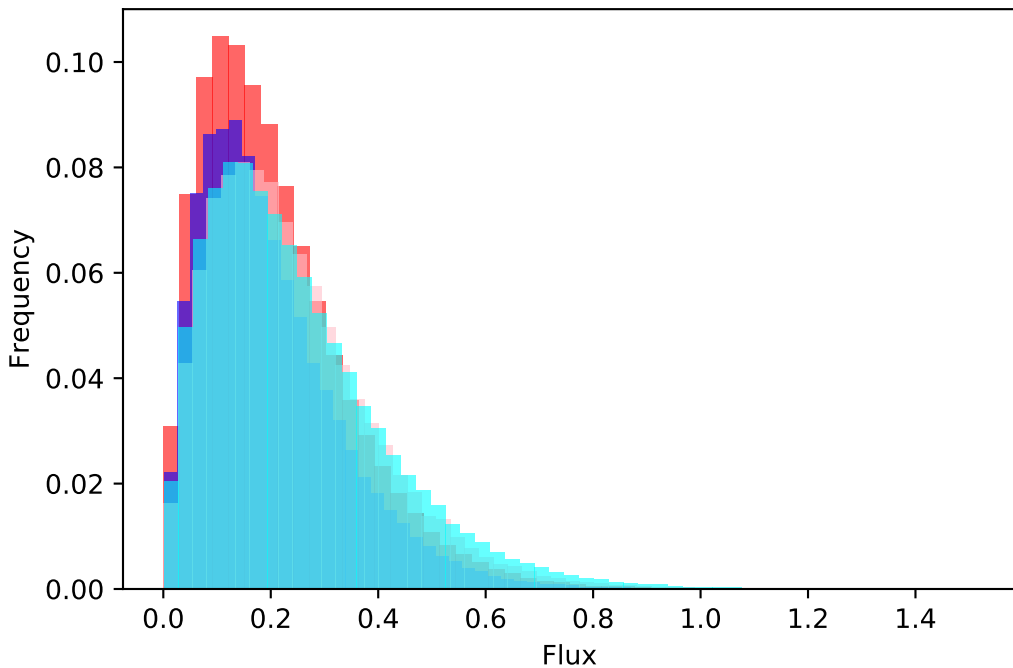
88 : GLX_p + Glu_p --> Gly_p + KG_p
['AT1G70580', 'AT1G23310']
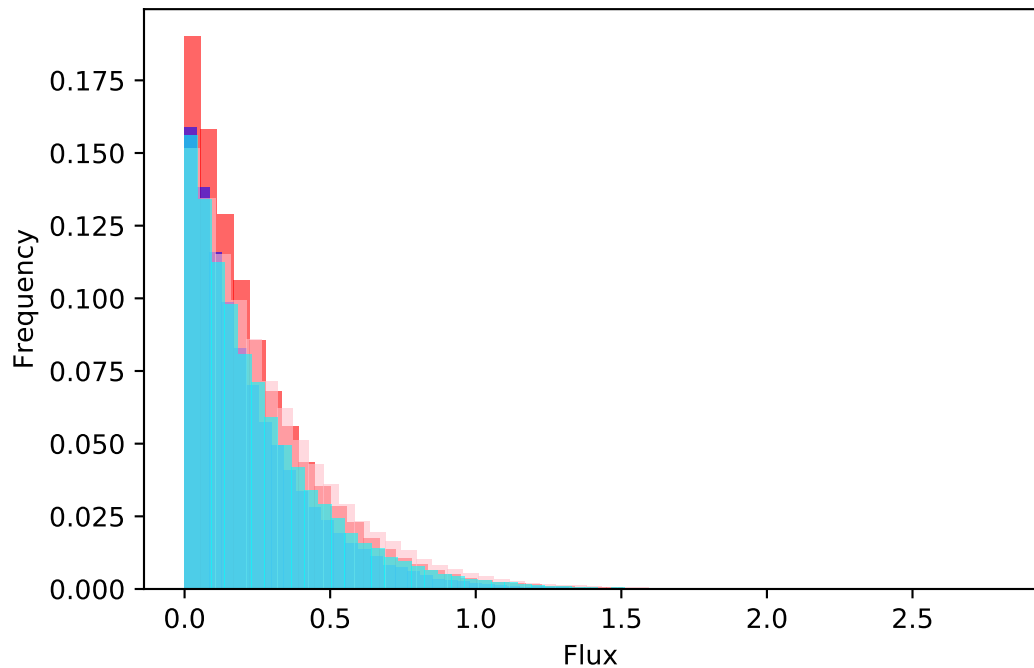
89 : Gly_m + H_m + LPL_m --> CO2_m + amDHP_m
['AT2G26080', '2*AT4G33010']
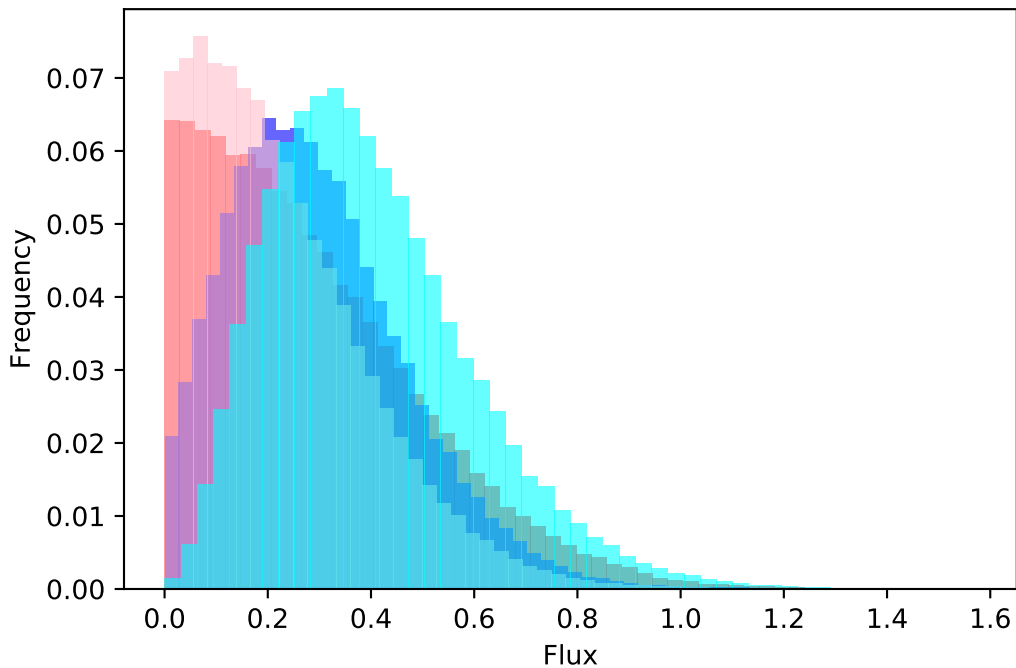
90 : THF_m + amDHP_m --> DHP_m + M_DASH_THF_m + NH4_m
['AT1G11860']
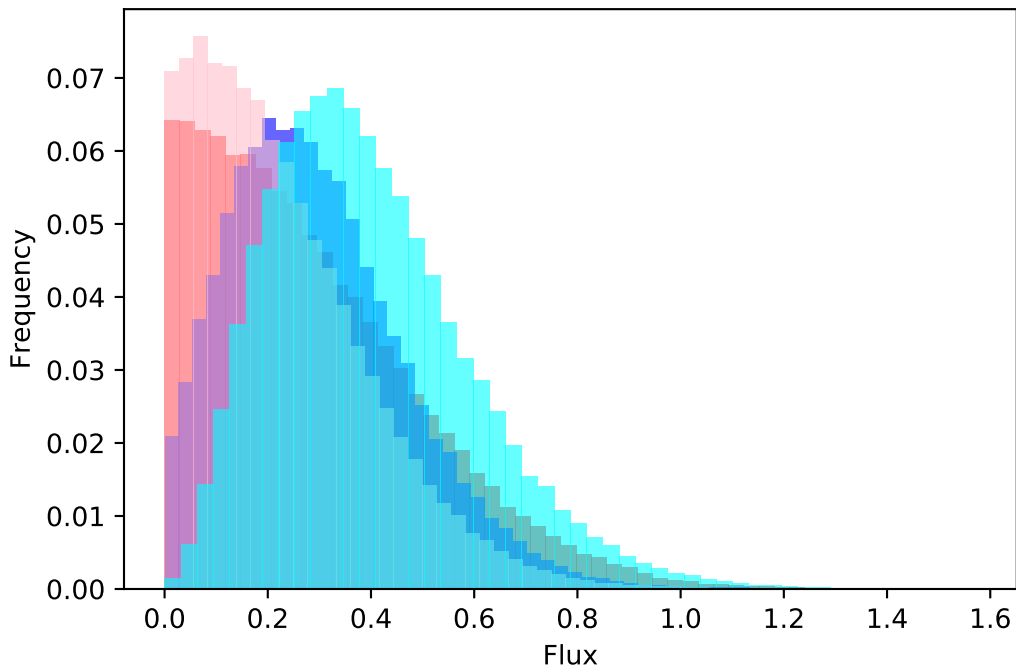
91 : DHP_m + NAD_m --> H_m + LPL_m + NADH_m
['2*AT1G48030', 'AT3G17240']
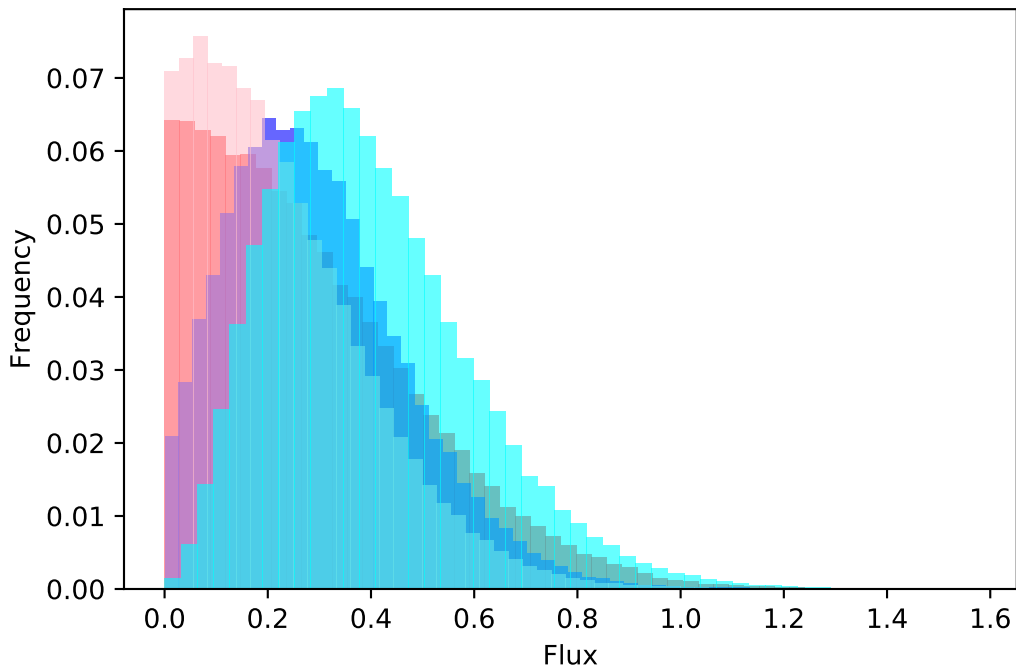
92 : Gly_m + H2O_m + M_DASH_THF_m <=> Ser_m + THF_m
['AT5G26780', '4*AT4G37930']
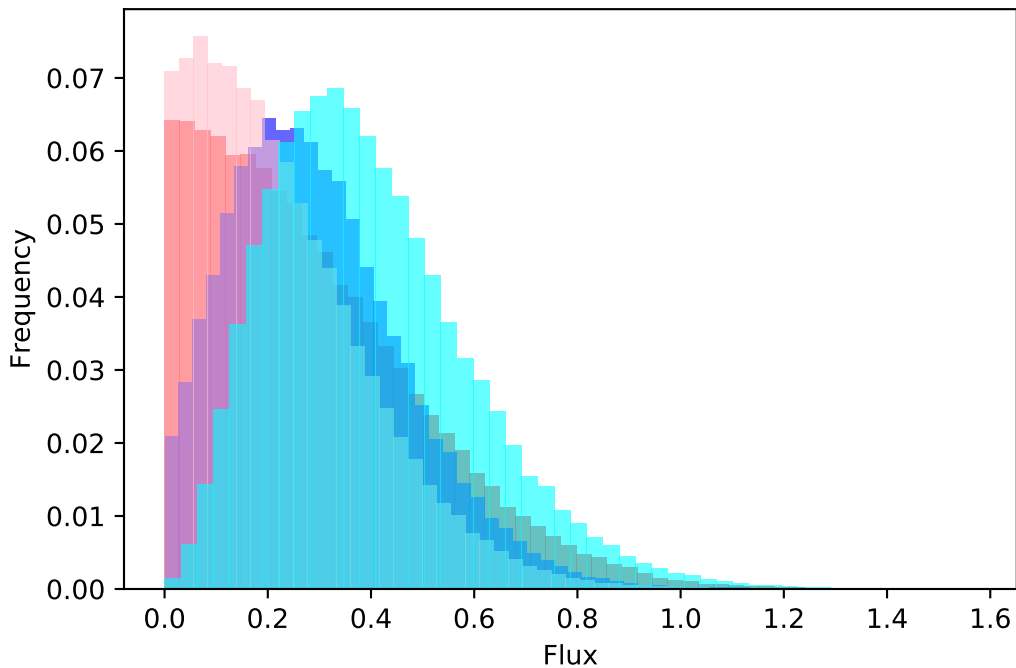
93 : GLX_p + Ser_p --> Gly_p + HPR_p
['2*AT2G13360']
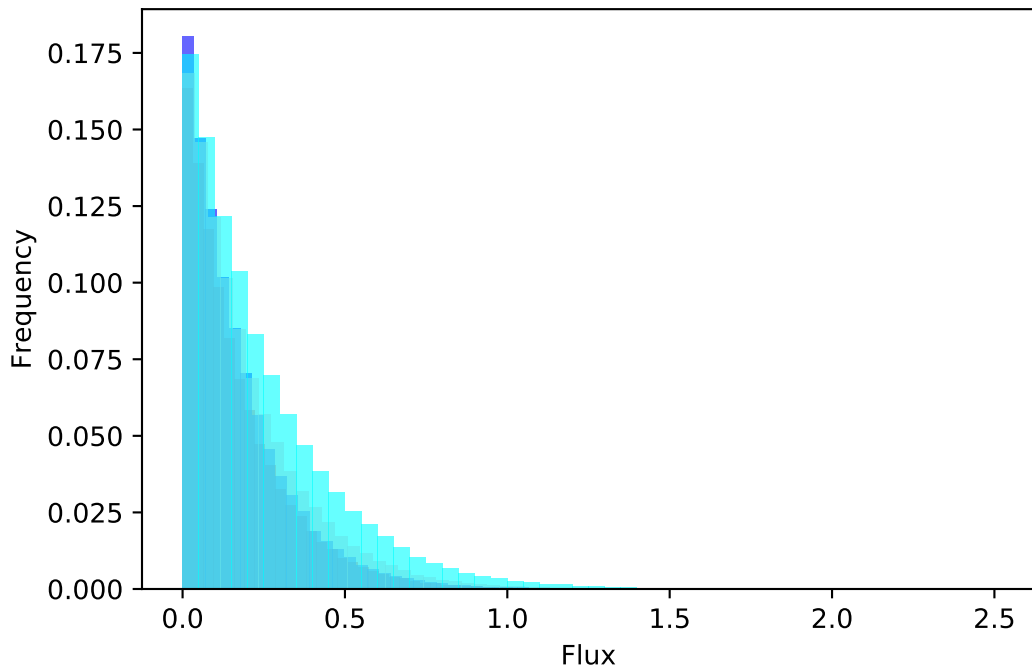
94 : HPR_p + H_p + NADH_p --> GCEA_p + NAD_p
['AT1G68010']
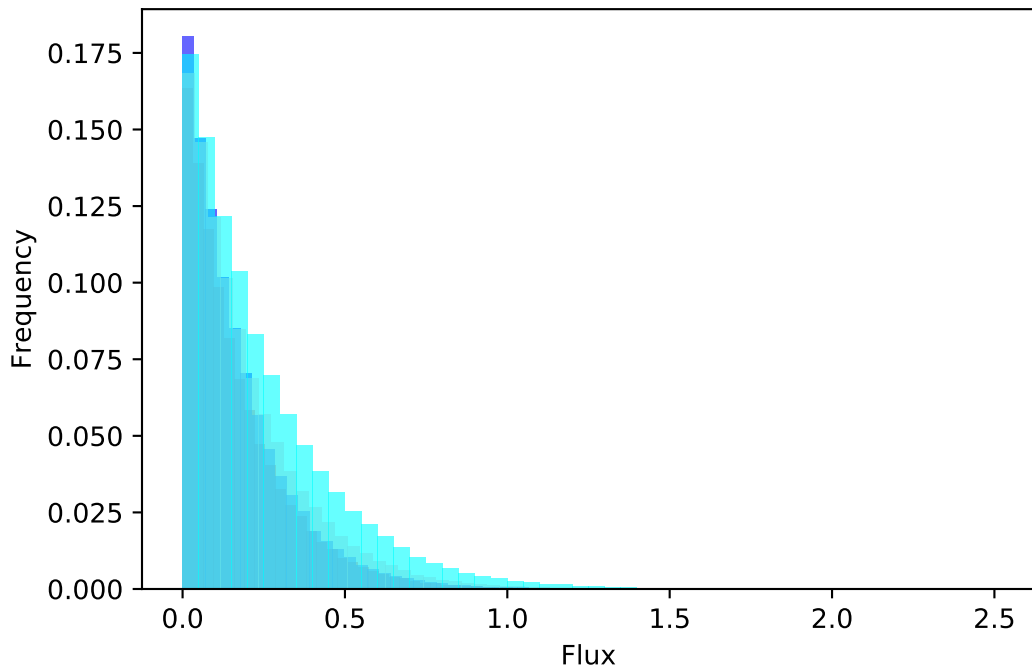
95 : Mal_p + NAD_p <=> H_p + NADH_p + OAA_p
['AT5G09660', 'AT2G22780']
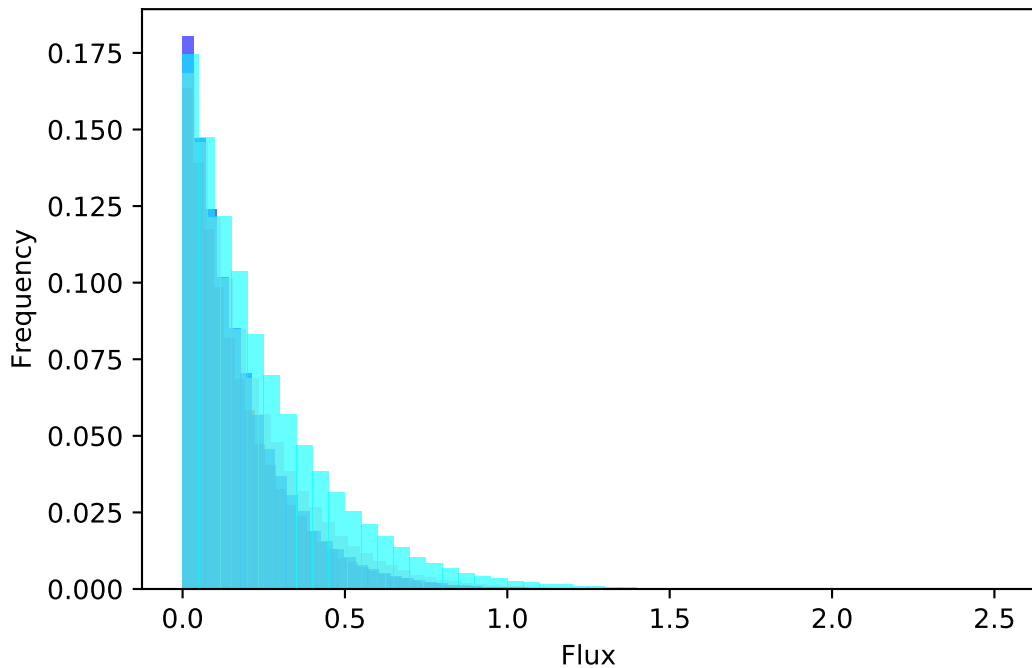
96 : ATP_h + GCEA_h --> ADP_h + H_h + PGA_h
['AT1G80380']
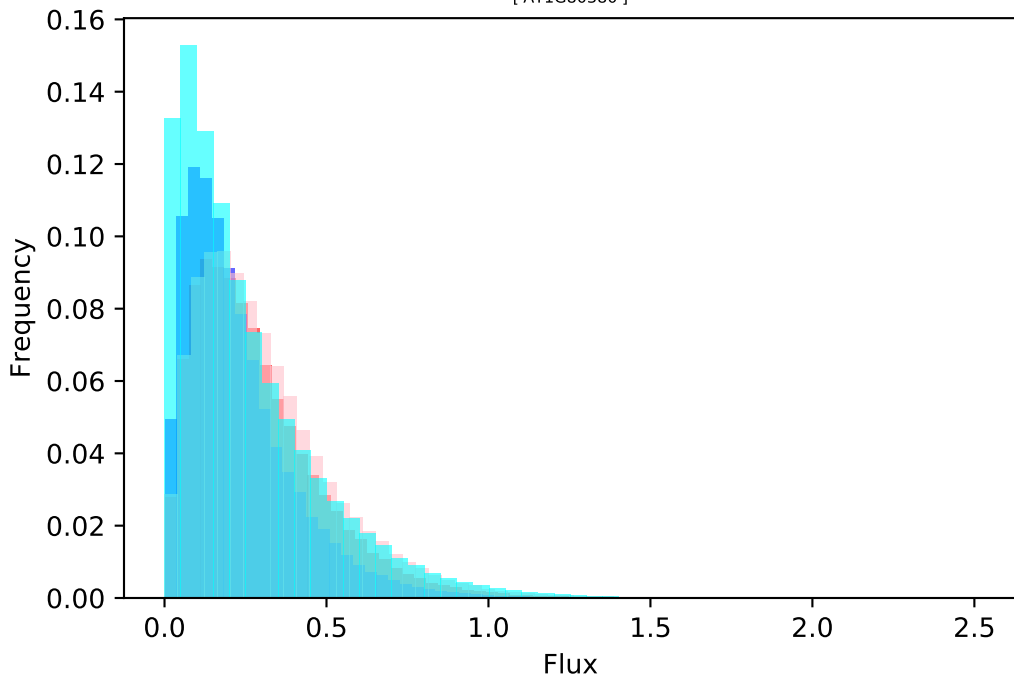
97 : G6P_h + NADP_h --> GLP_h + H_h + NADPH_h
['AT5G13110', 'AT5G35790', 'AT1G09420', 'AT1G24280', 'AT3G27300']
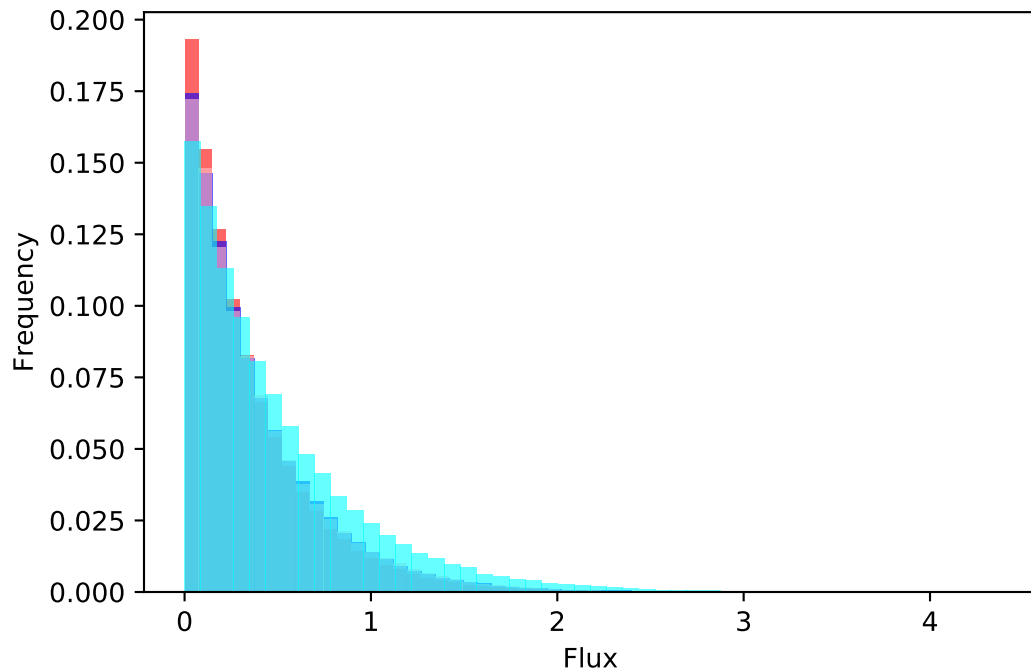
98 : GLP_h + H2O_h --> 6PG_h + H_h
['AT5G24420', 'AT1G13700', 'AT5G24400', 'AT5G24410', 'AT3G49360']
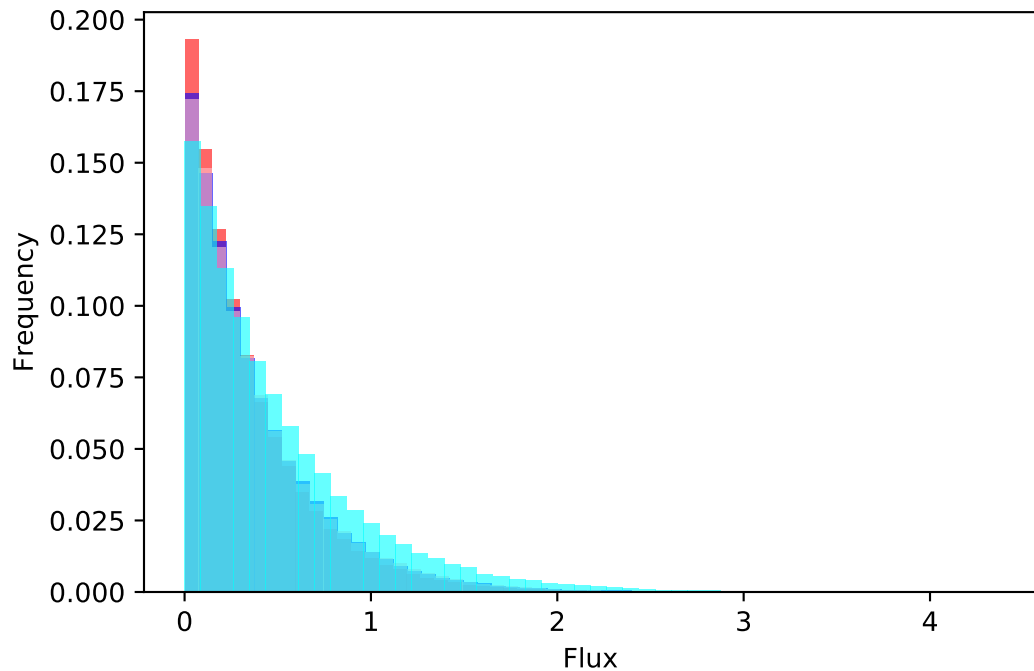
99 : 6PG_h + NAD_h <=> CO2_h + NADH_h + Ru5P_h
['AT1G64190', 'AT5G41670', 'AT3G02360']
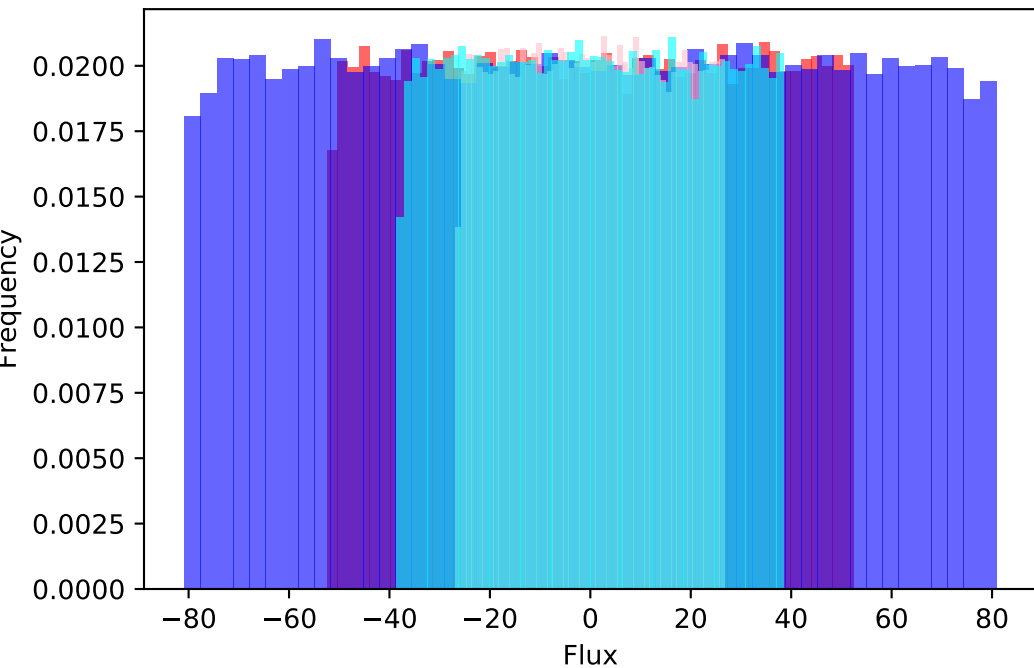
100 : 6PG_h + NADP_h <=> CO2_h + NADPH_h + Ru5P_h
['AT1G64190', 'AT5G41670', 'AT3G02360']
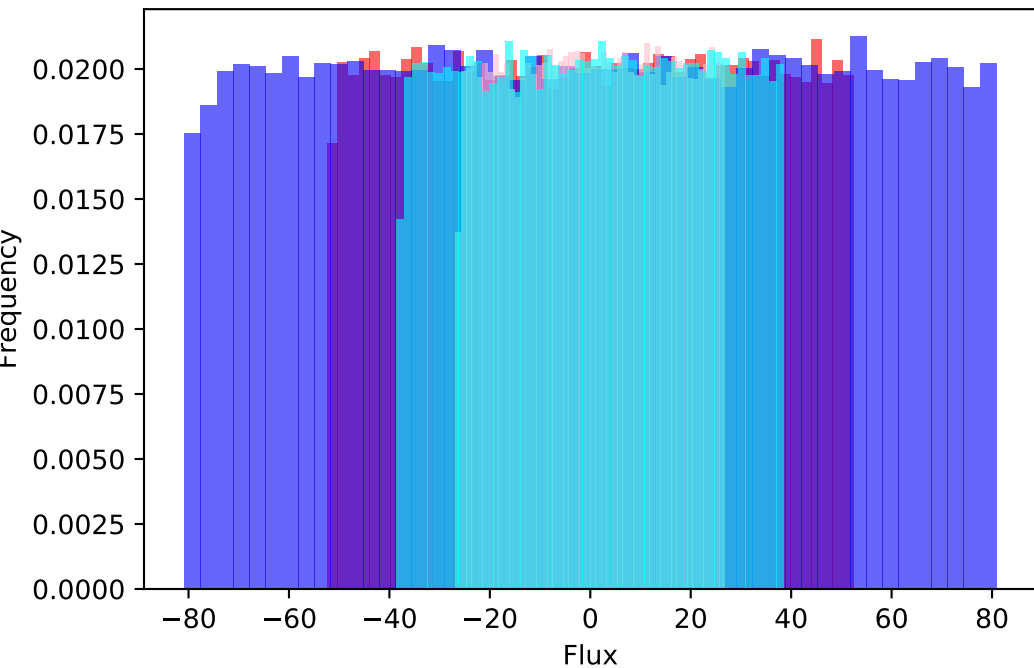
101 : GAP_h + S7P_h <=> E4P_h + F6P_h
['AT1G12230', 'AT5G13420']
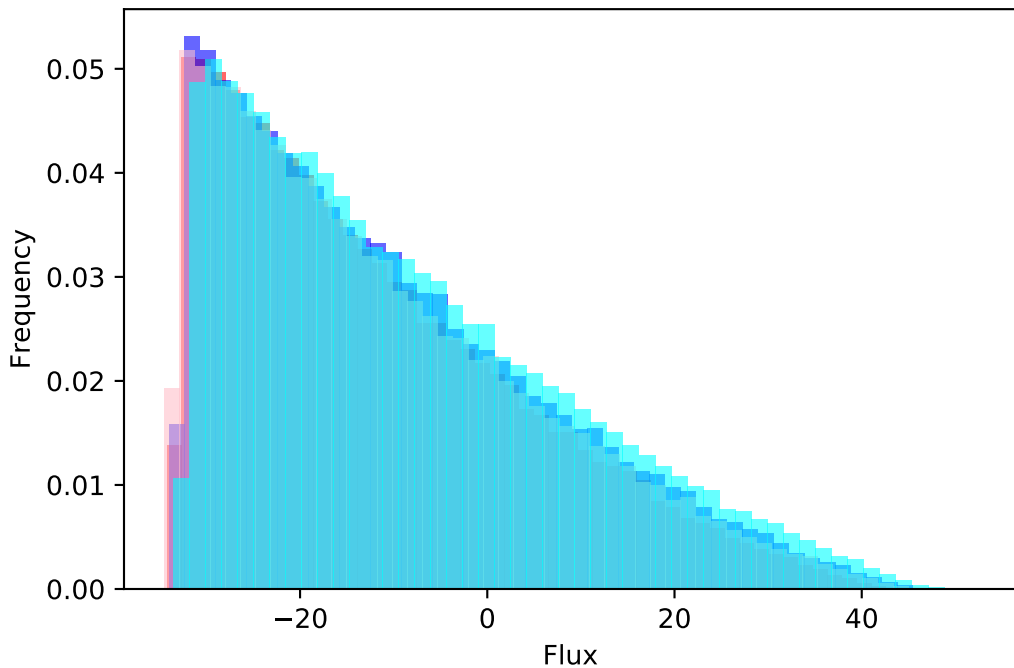
102 : E4P_h + H2O_h + PEP_h --> DAHP_h + Pi_h
['AT4G39980', 'AT1G22410', 'AT4G33510']
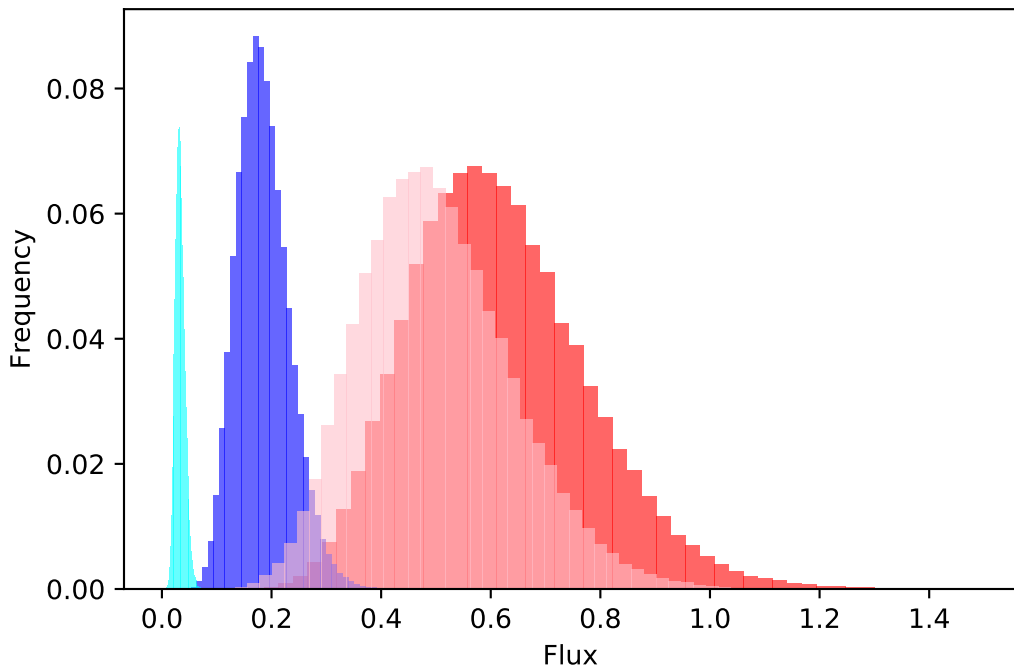
103 : DAHP_h --> DHQ_h + Pi_h
['AT5G66120']
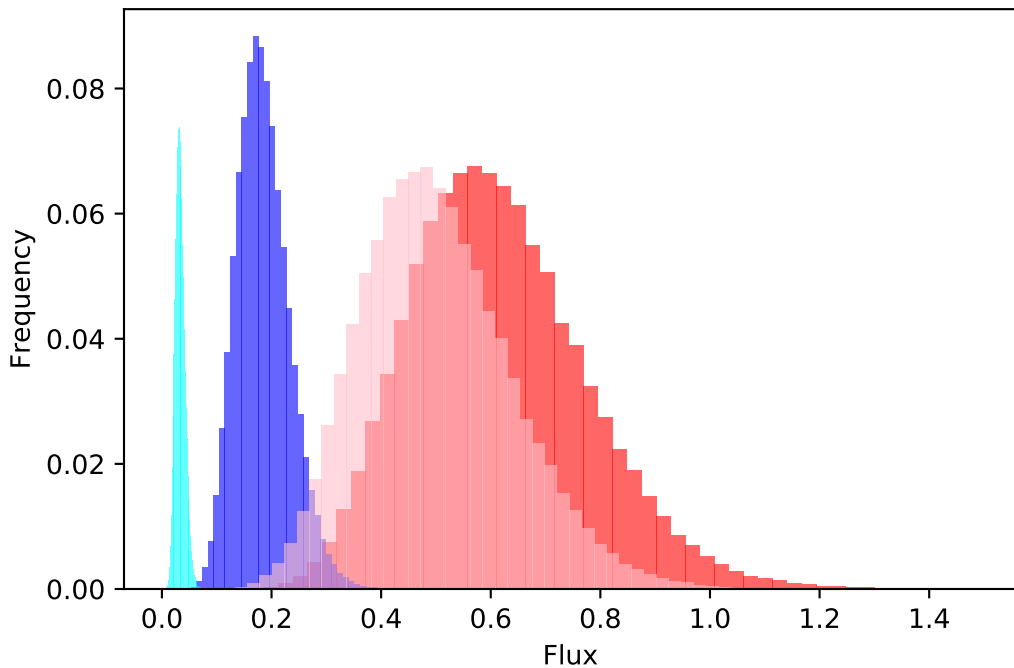
104 : DHQ_h --> DHS_h + H2O_h
['AT3G06350']
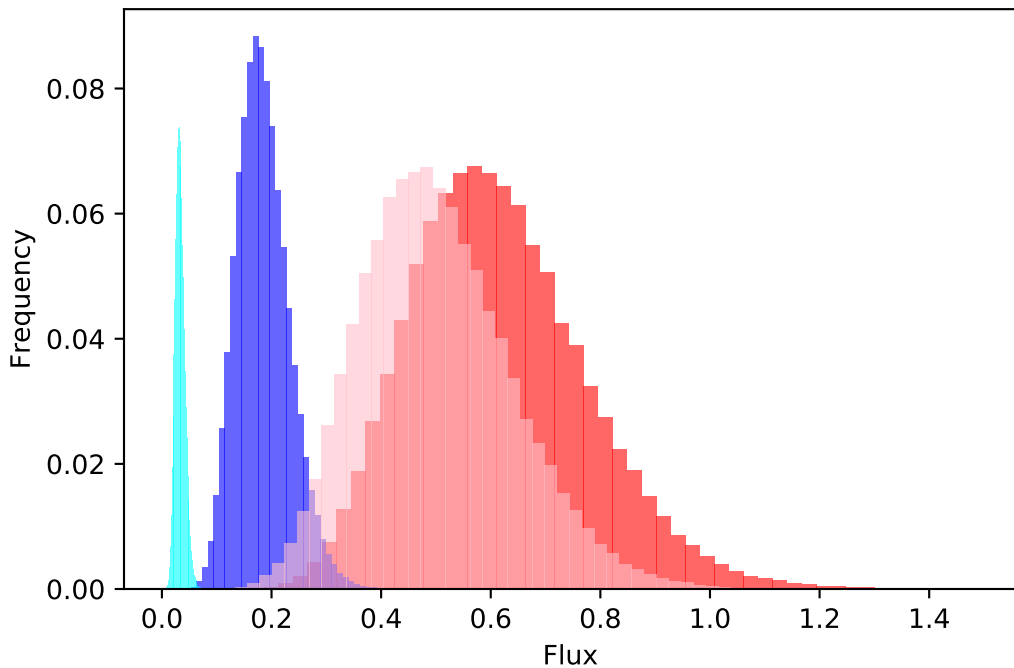
105 : DHS_h + H_h + NADPH_h --> NADP_h + SA_h
['AT3G06350']
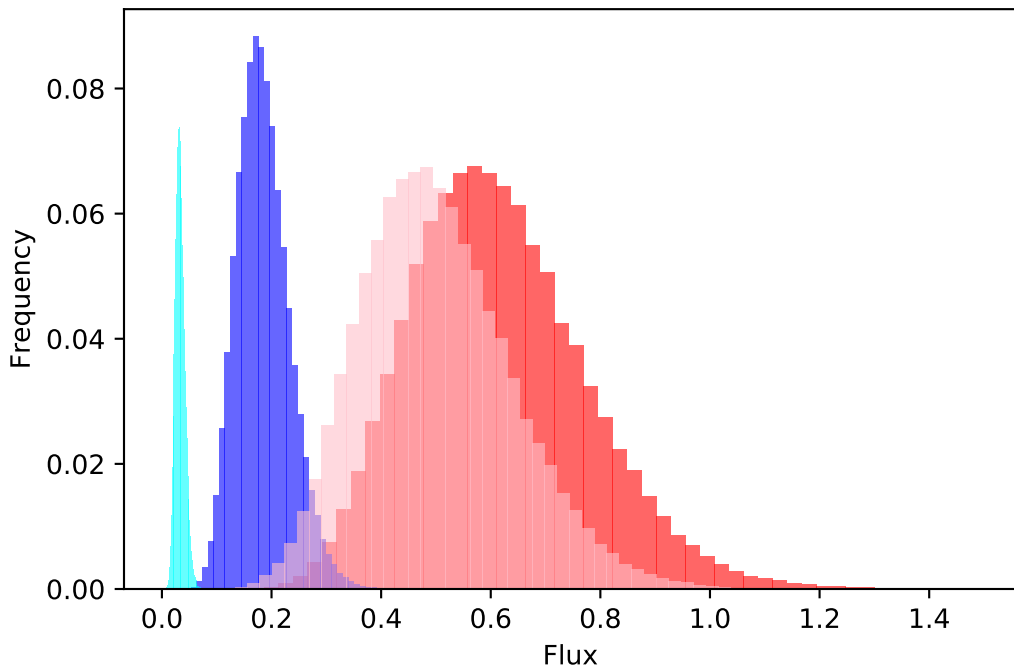
106 : ATP_h + SA_h --> ADP_h + H_h + S3P_h
['AT2G21940', 'AT4G39540']
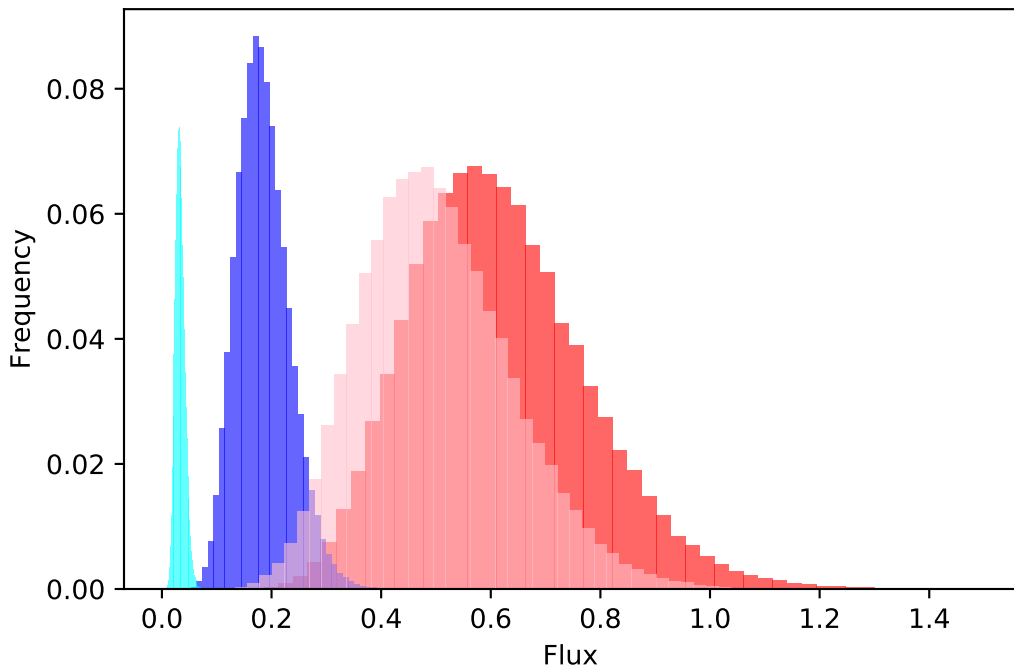
107 : PEP_h + S3P_h --> EPSP_h + Pi_h
['AT1G48860', 'AT2G45300']
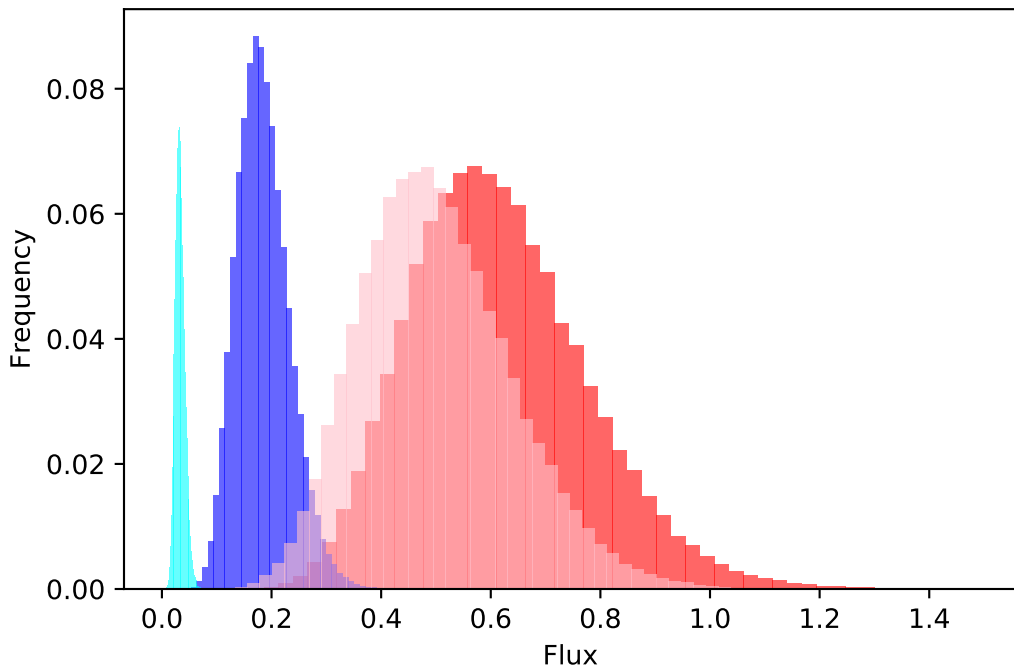
108 : EPSP_h --> CHR_h + Pi_h
['AT1G48850']
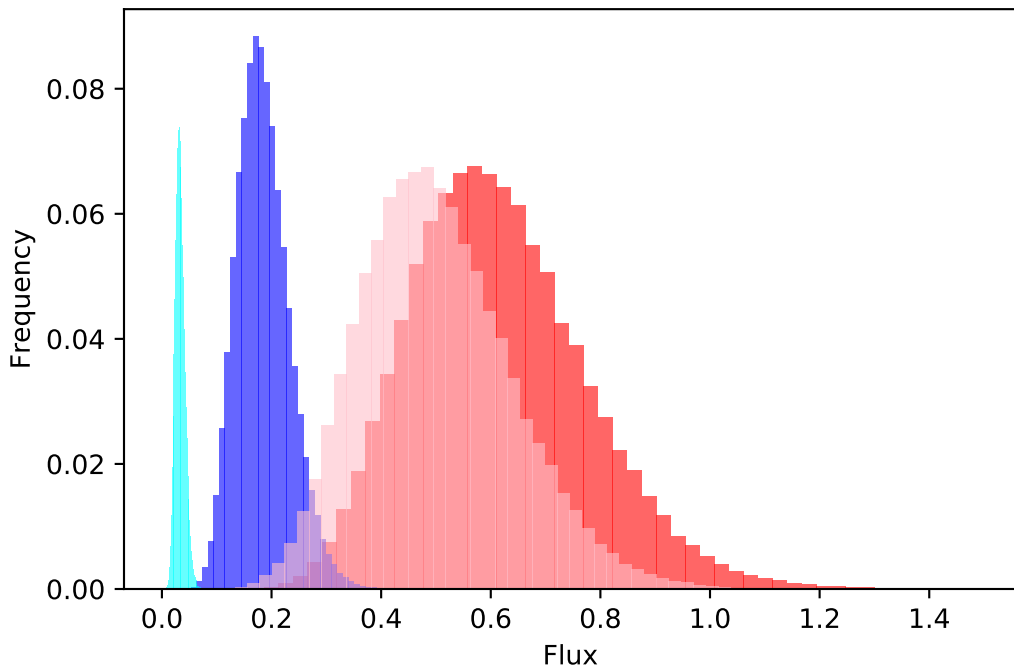
109 : ATP_h + R5P_h --> AMP_h + H_h + PRPP_h
['AT1G10700', 'AT2G35390', 'AT1G32380', 'AT2G44530']
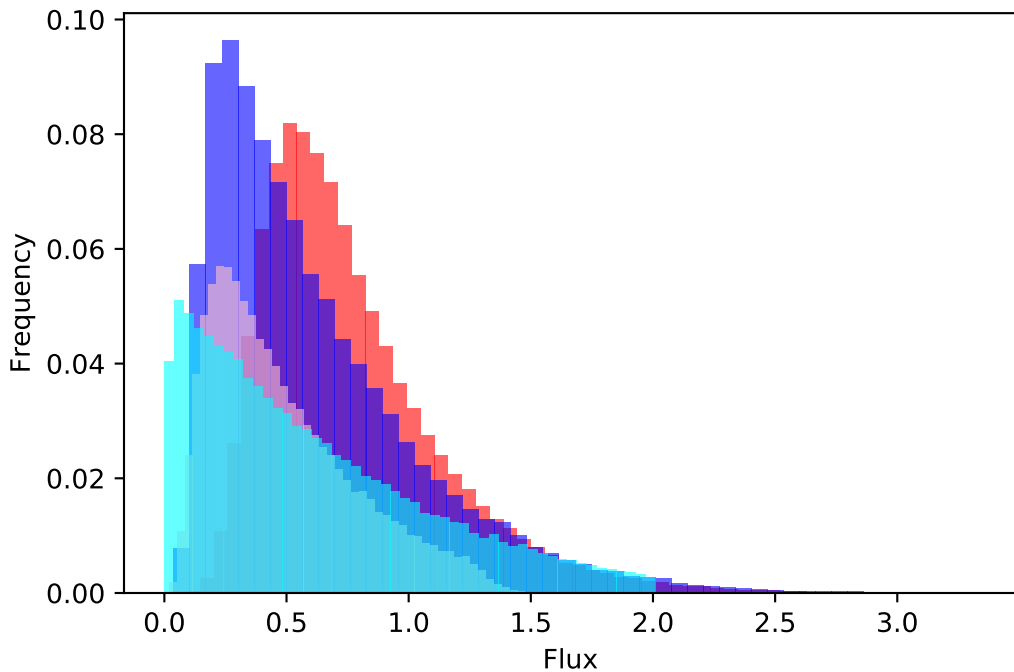
110 : ATP_h + Pi_h + Pyr_h <=> AMP_h + 2.0 H_h + PEP_h + PPi_h
['AT4G15530']
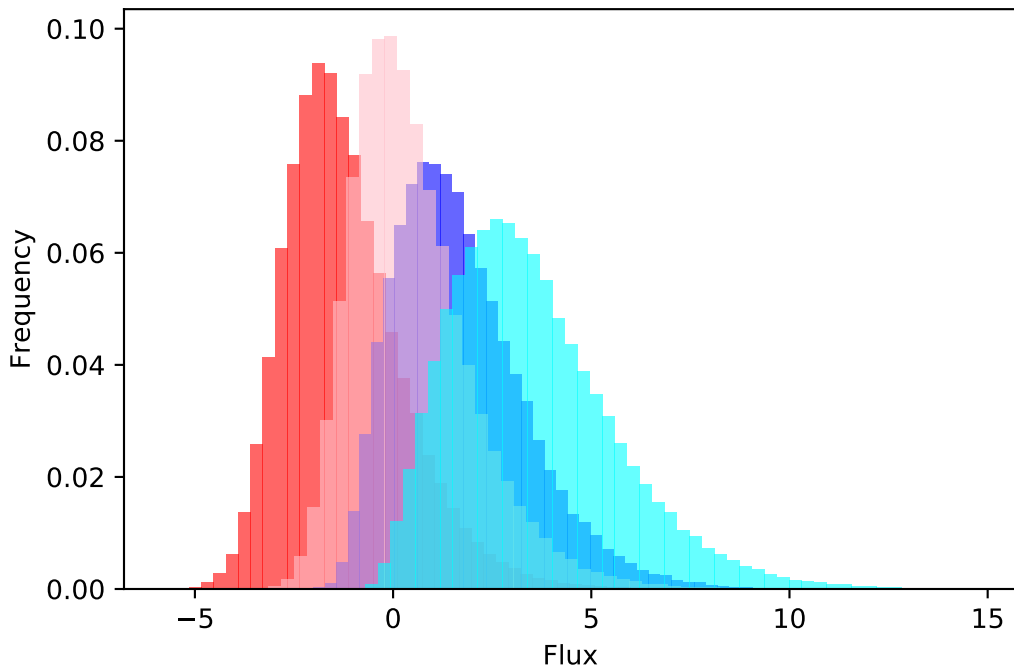
111 : H_c + Mal_c + NADP_c --> CO2_c + NADPH_c + Pyr_c
['AT5G25880', '4*AT2G19900', 'AT5G11670']
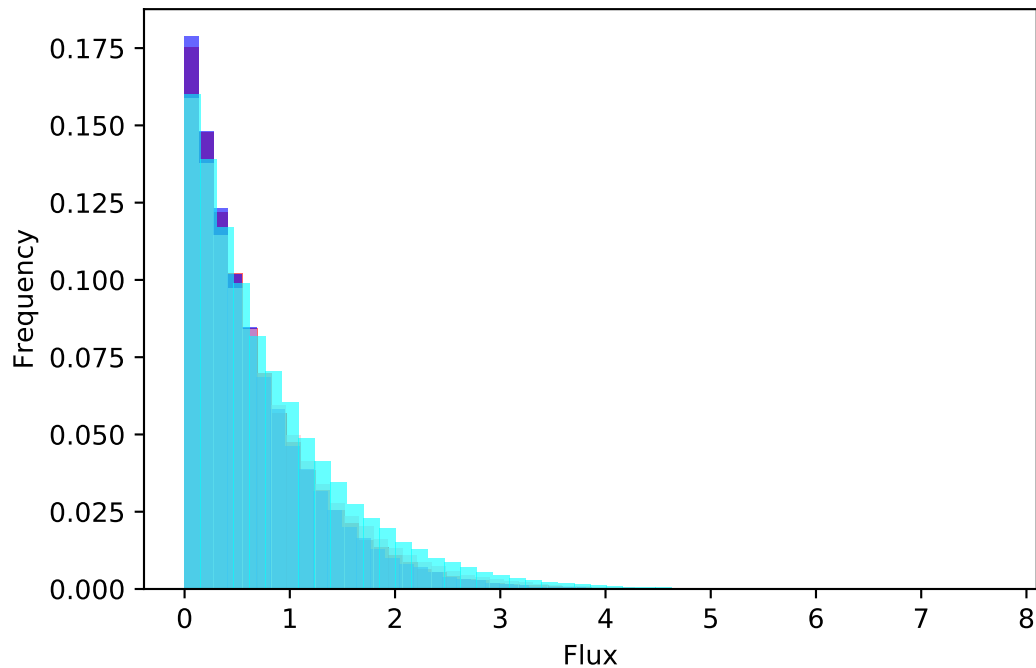
112 : Mal_h + NADP_h --> CO2_h + NADPH_h + Pyr_h
['4*AT5G11670', 'AT1G79750', 'AT5G25880']
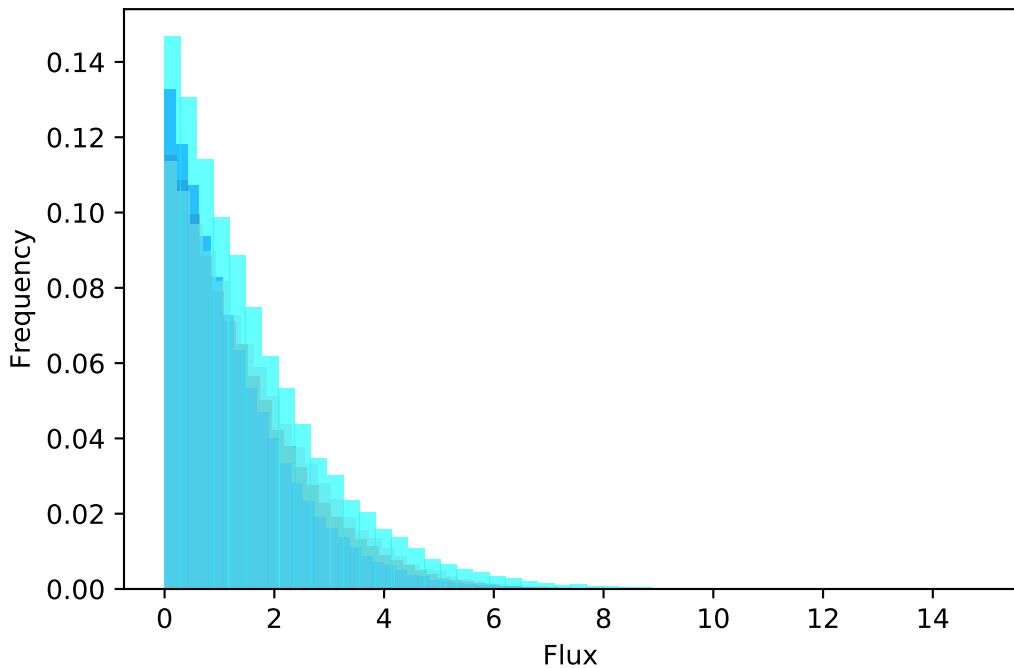
113 : Mal_h + NAD_h <=> H_h + NADH_h + OAA_h
['AT5G09660', 'AT3G47520', 'AT2G22780', 'AT1G53240', 'AT1G04410']
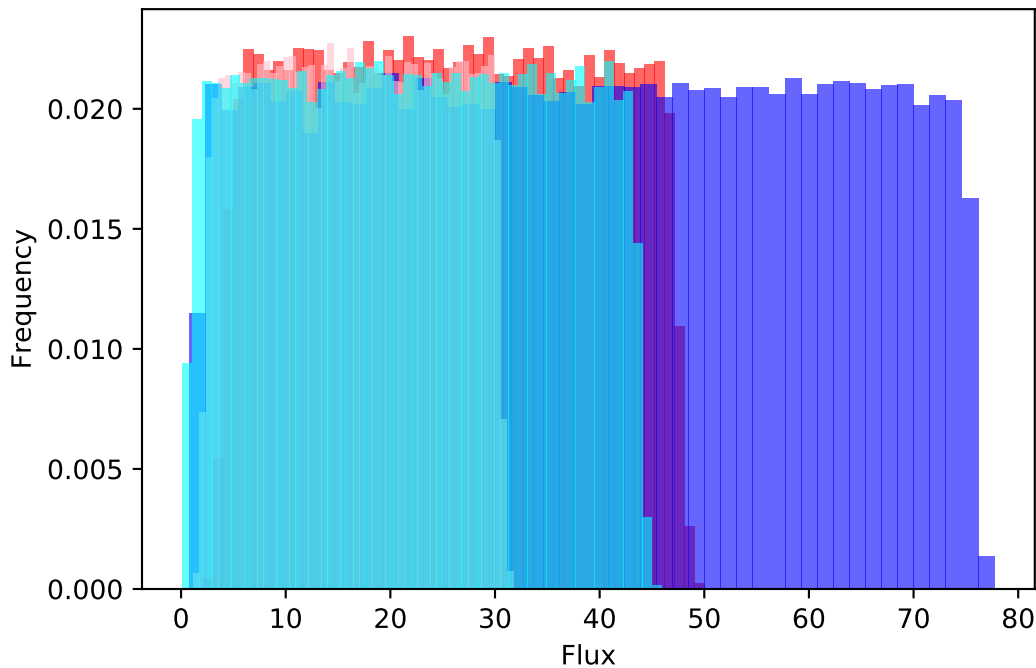
114 : NADPH_c + OAA_c --> Mal_c + NADP_c
['AT5G58330']
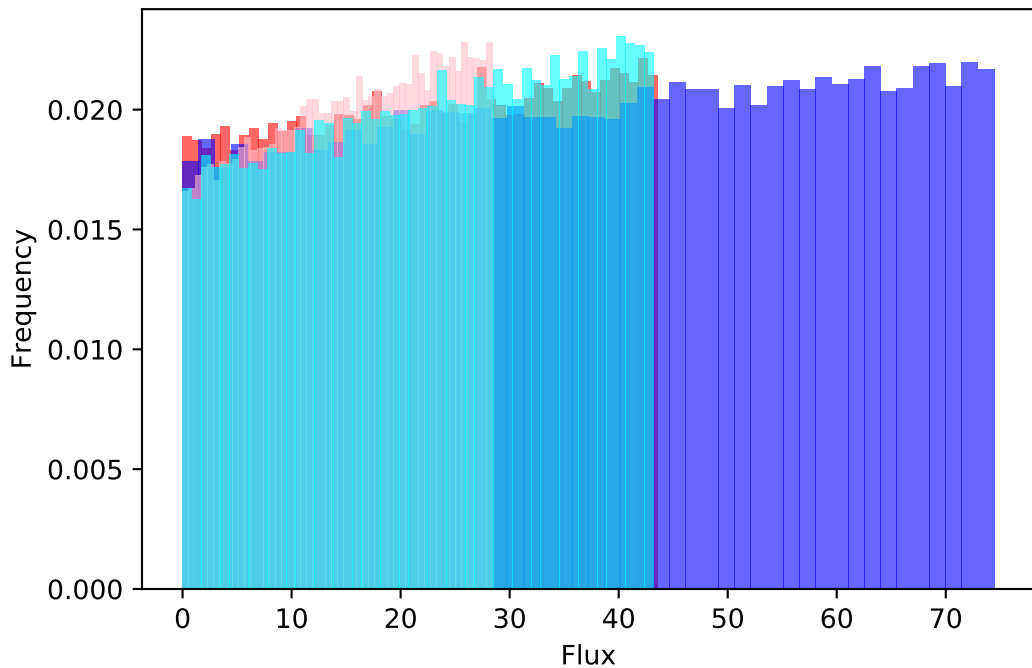
115 : H_h + NADPH_h + OAA_h --> Mal_h + NADP_h
['AT5G58330']
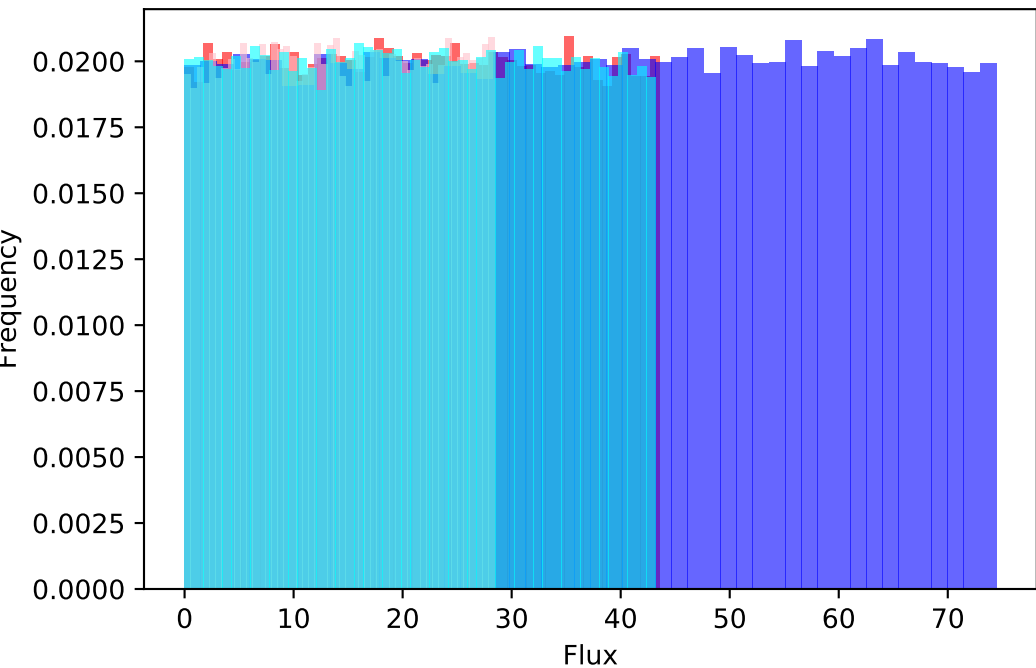
116 : H_m + NADPH_m + OAA_m --> Mal_m + NADP_m
['AT5G58330']
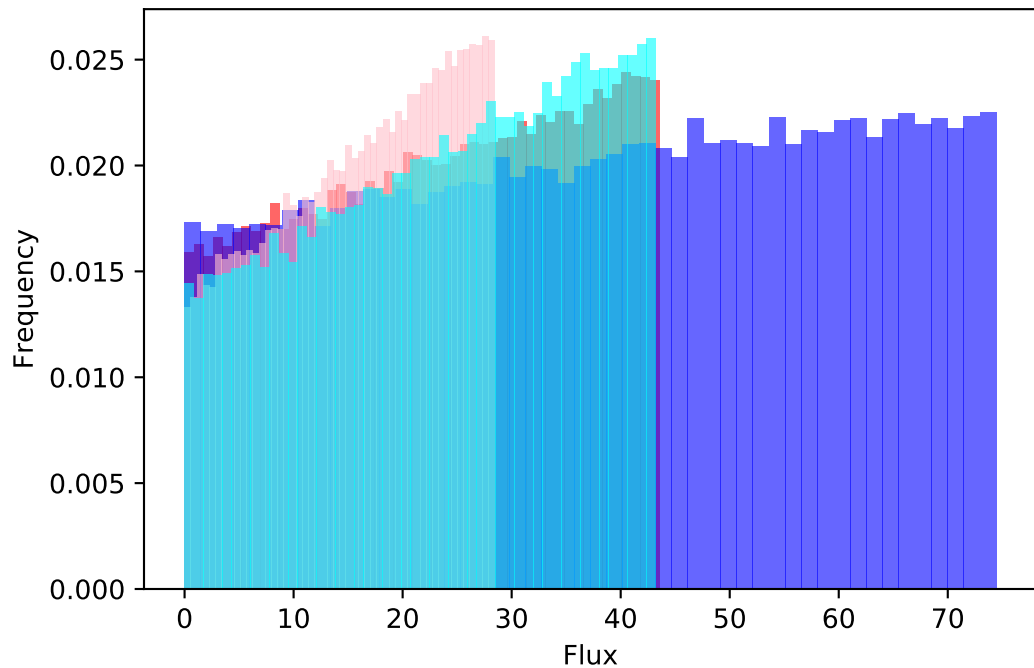
117 : A_DASH_CoA_c + H2O_c + OAA_c --> Cit_c + CoA_c + H_c
['AT3G58750', 'AT2G42790']
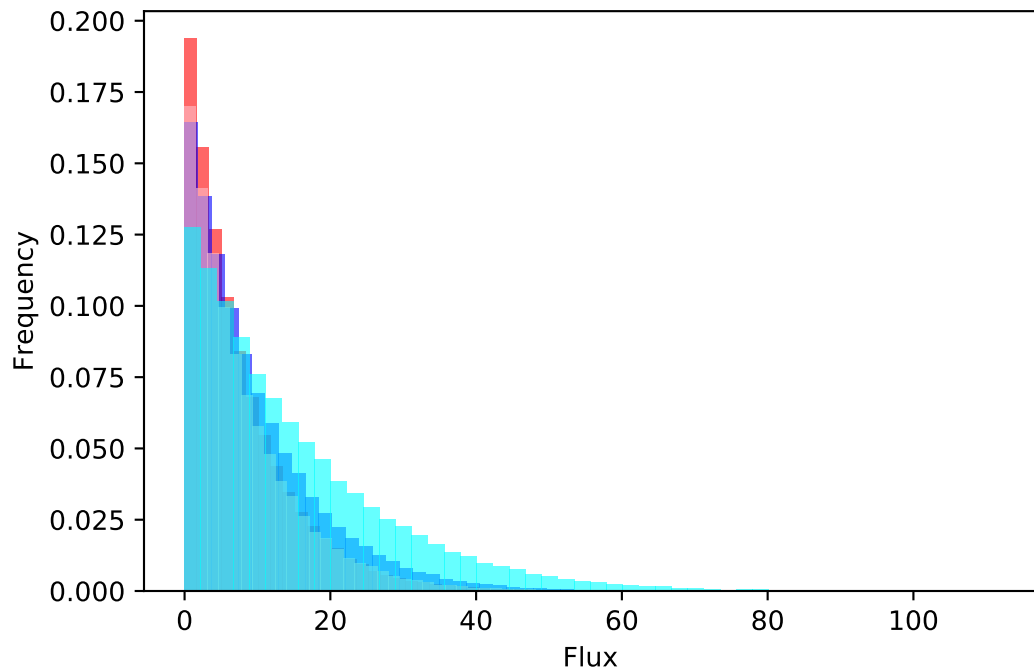
118 : A_DASH_CoA_h + H2O_h + OAA_h --> Cit_h + CoA_h + H_h
['AT2G44350']
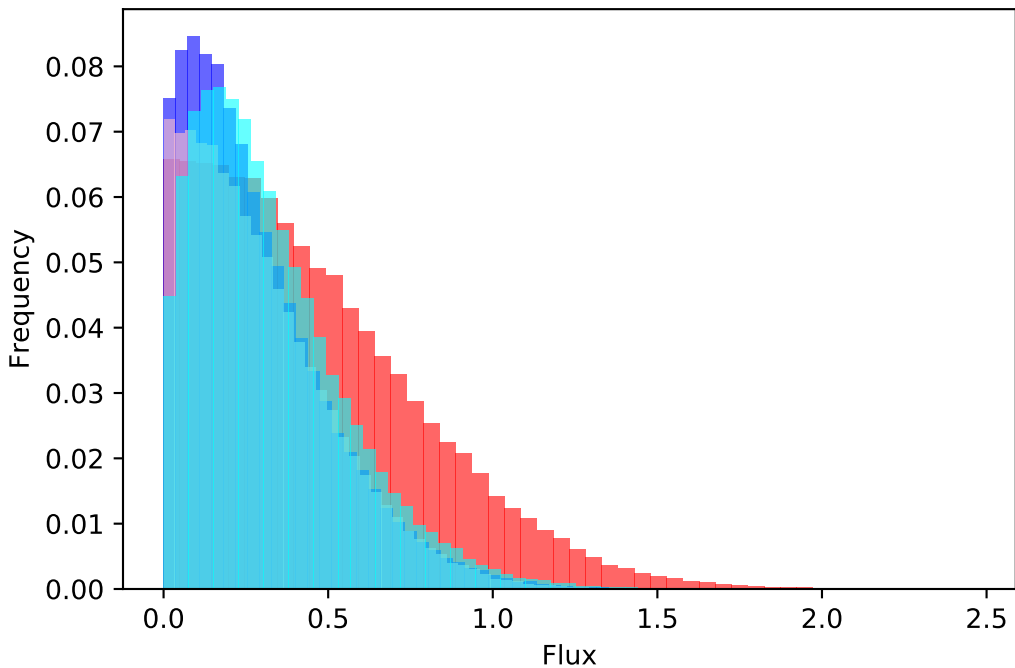
119 : Cit_c --> H2O_c + cACN_c
['AT4G35830', 'AT4G26970', 'AT2G05710']
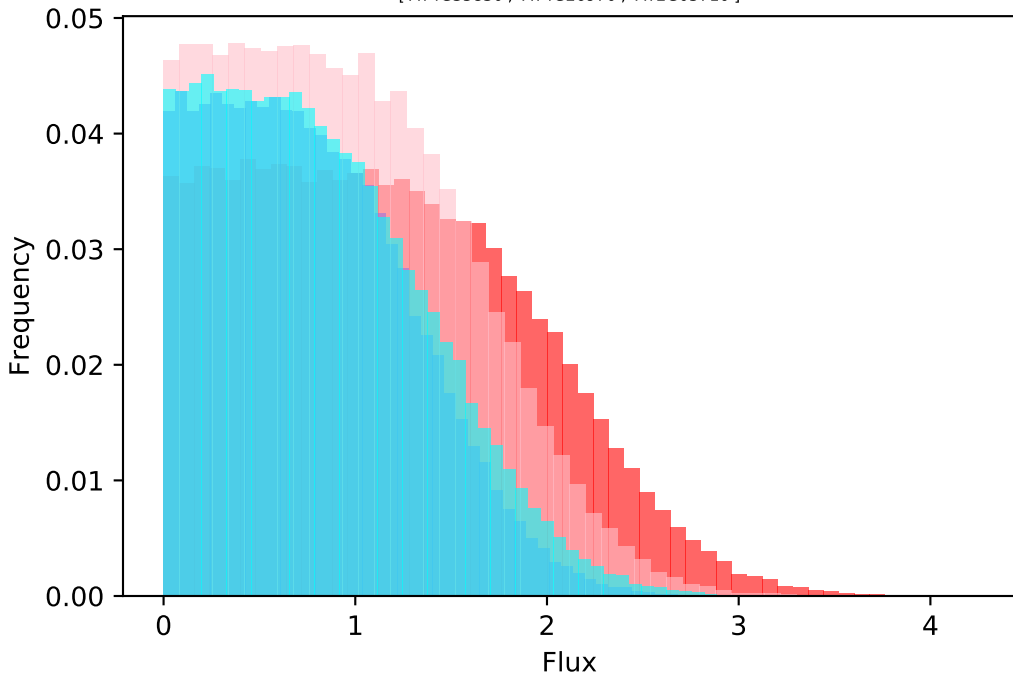
120 : Cit_h --> H2O_h + cACN_h
['AT2G05710', 'AT4G26970']
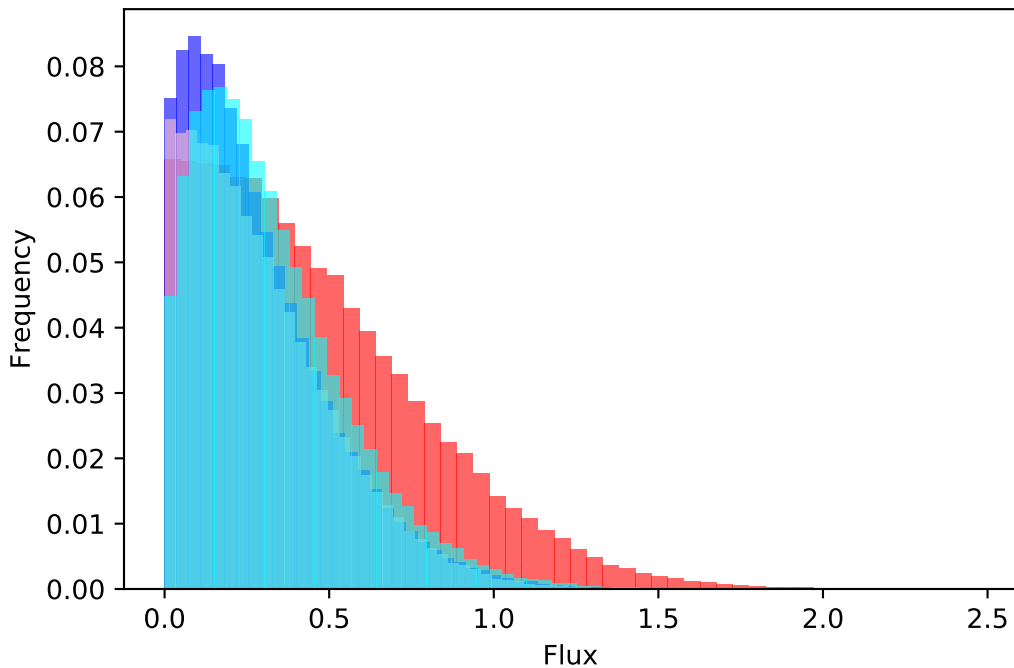
121 : H2O_c + cACN_c --> iCit_c
['AT4G35830', 'AT4G26970', 'AT2G05710']
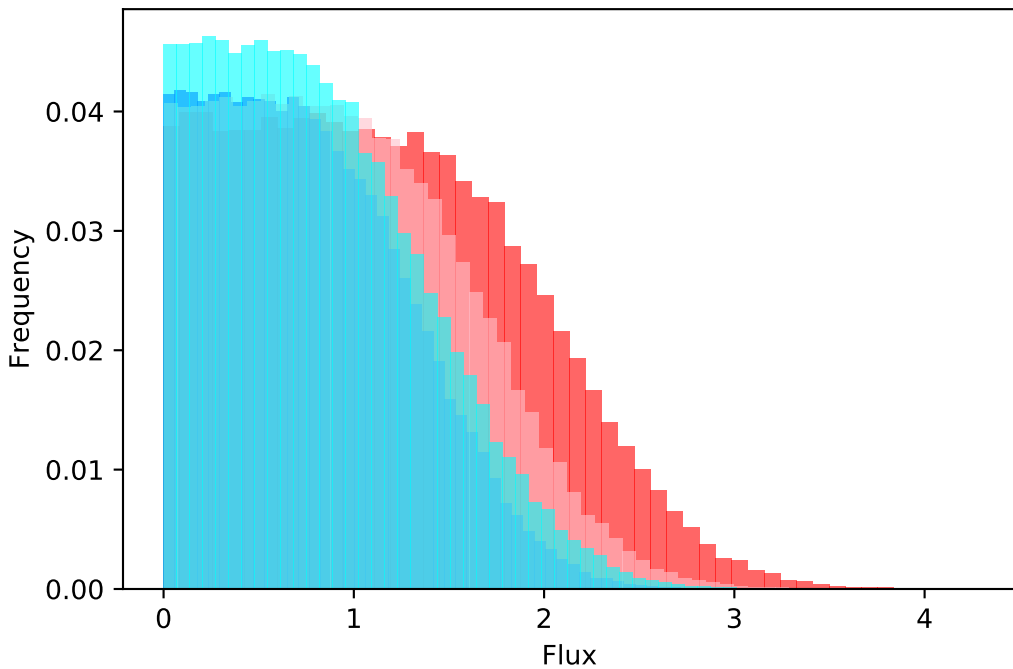
122 : H2O_h + cACN_h --> iCit_h
['AT2G05710', 'AT4G26970']
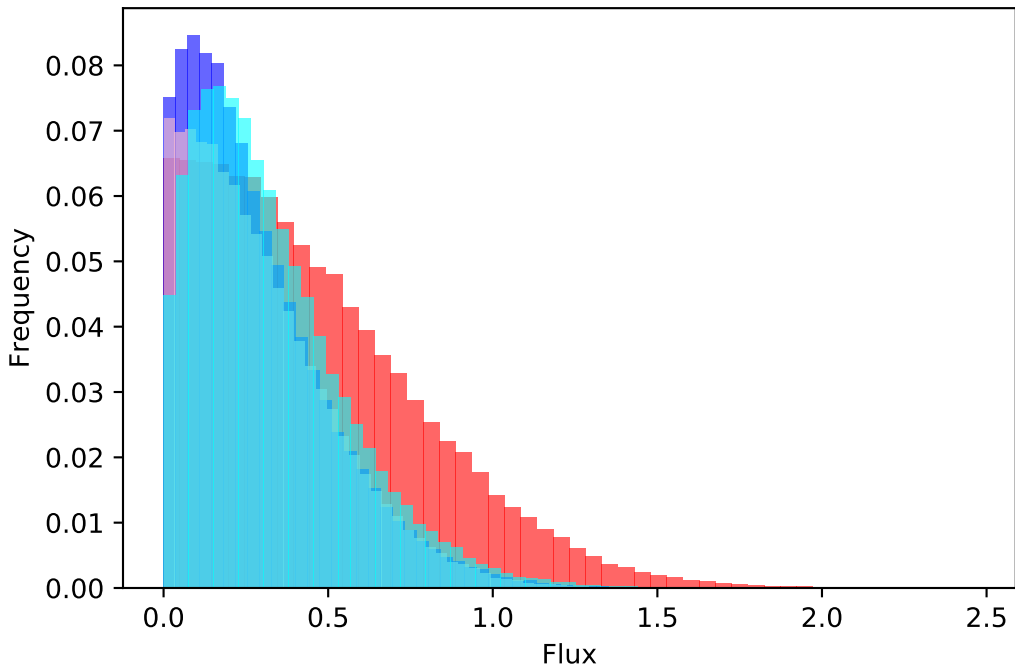
123 : H_c + NAD_c + iCit_c --> CO2_c + KG_c + NADH_c
['AT1G32480']
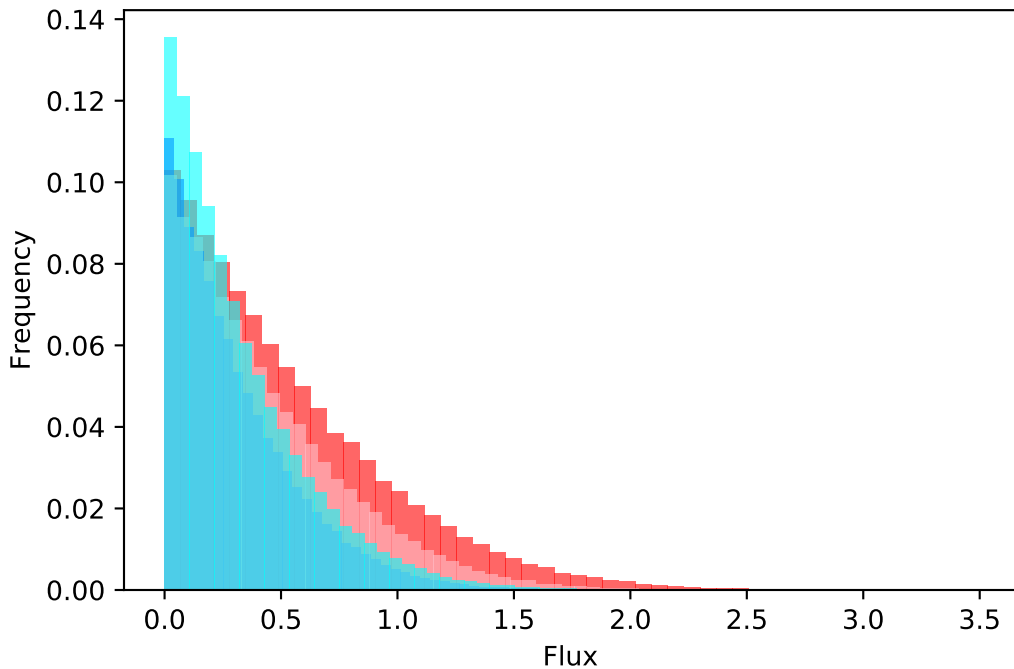
124 : H_c + NADP_c + iCit_c --> CO2_c + KG_c + NADPH_c
['AT1G65930']
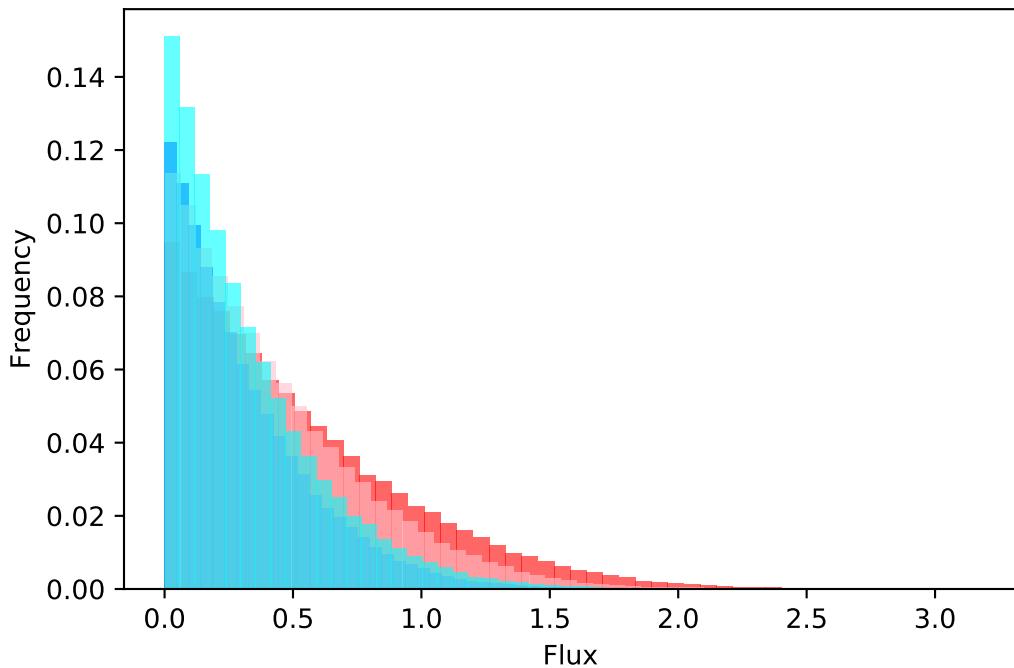
125 : NADP_h + iCit_h --> CO2_h + KG_h + NADPH_h
['AT1G54340', 'AT1G65930', 'AT5G14590']
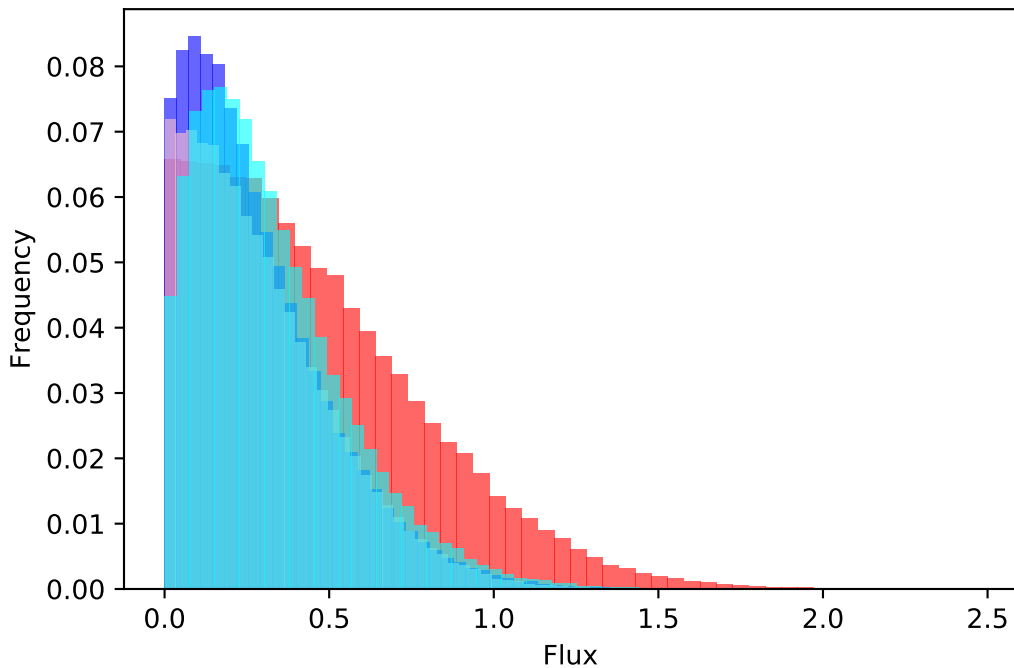
126 : NADP_m + iCit_m --> CO2_m + KG_m + NADPH_m
['AT5G14590']
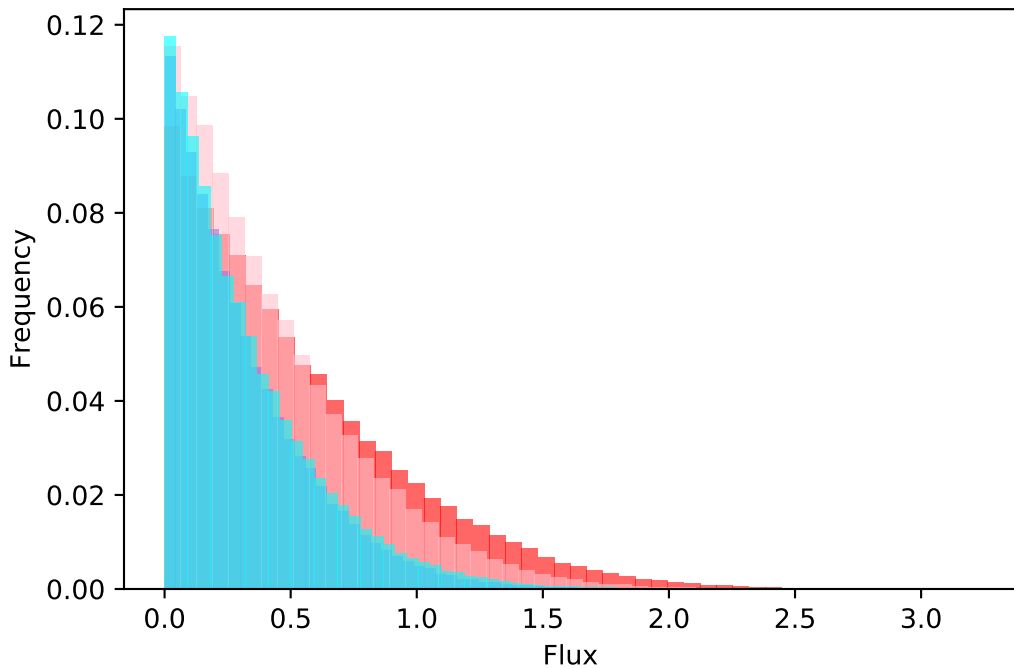
127 : iCit_c --> GLX_c + SCA_c
['AT3G21720']
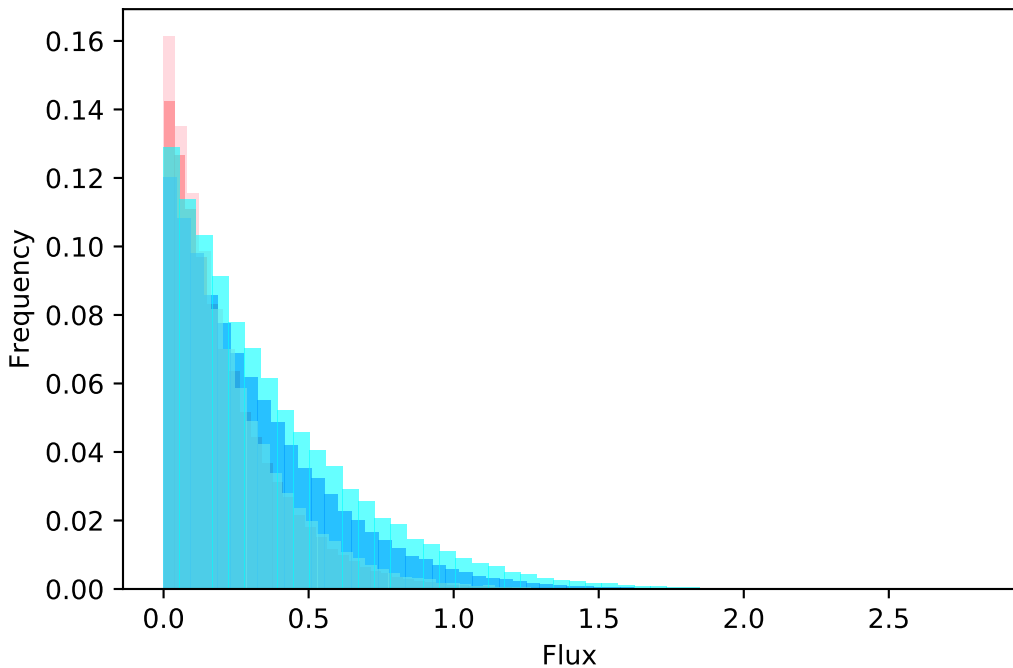
128 : A_DASH_CoA_c + GLX_c + H2O_c --> CoA_c + H_c + Mal_c
['AT5G03860']
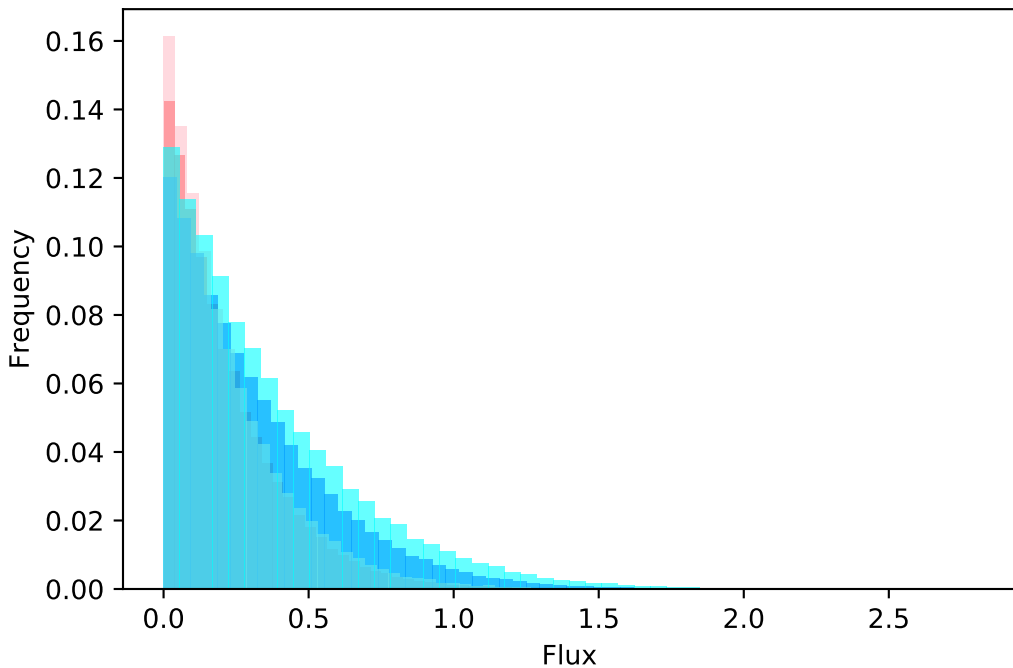
129 : ATP_c + Cit_c + CoA_c --> ADP_c + A_DASH_CoA_c + OAA_c + Pi_c
['AT1G09430', 'AT1G60810', '4*AT3G06650AT5G49460', '4*AT1G10670']
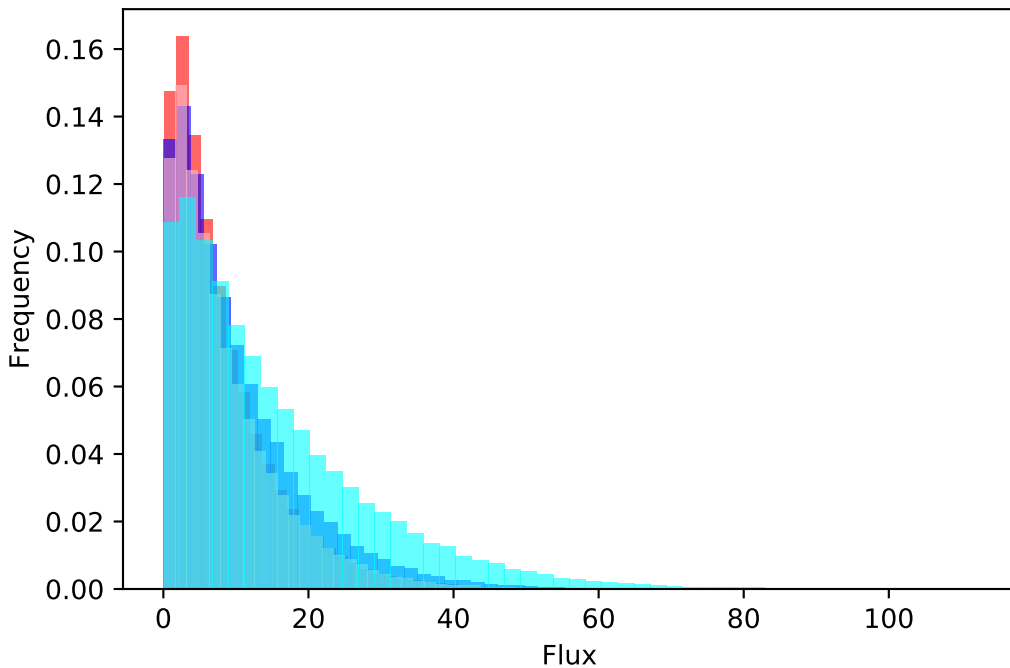
130 : AC_h + ATP_h + CoA_h --> AMP_h + A_DASH_CoA_h + H_h + PPi_h
['AT5G36880']
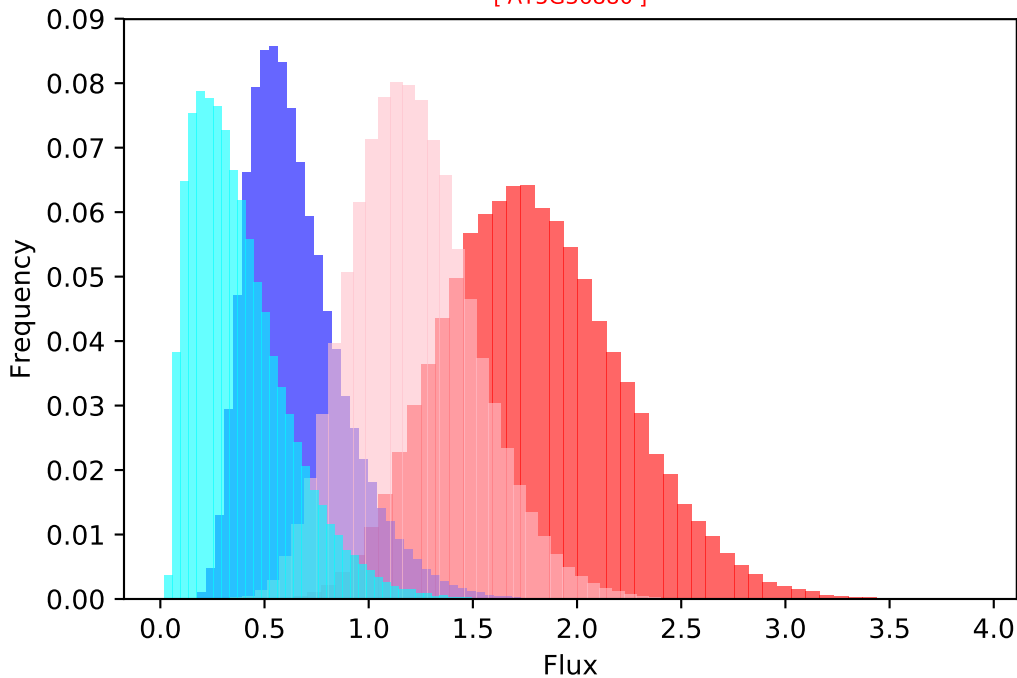
131 : ATP_h + A_DASH_CoA_h + HCO3_h --> ADP_h + H_h + M_DASH_CoA_h + Pi_h
['AT5G15530', 'AT5G16390', 'AT5G35360', '2*ATCG00500', '2*AT2G38040']
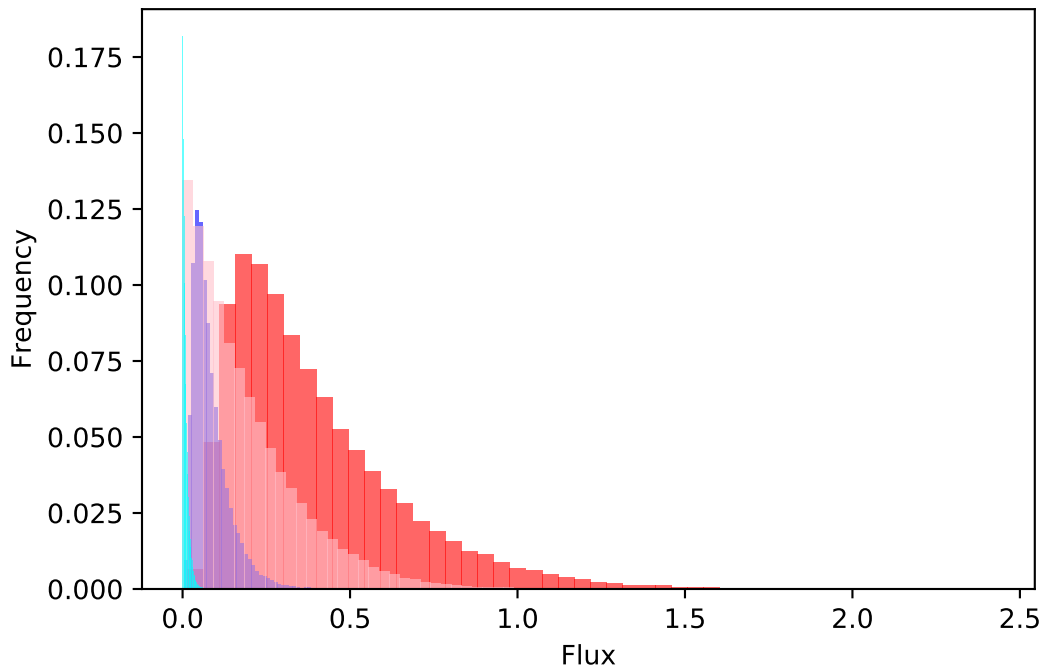
132 : ACP_h + M_DASH_CoA_h --> CoA_h + M_DASH_ACP_h
['AT2G30200']
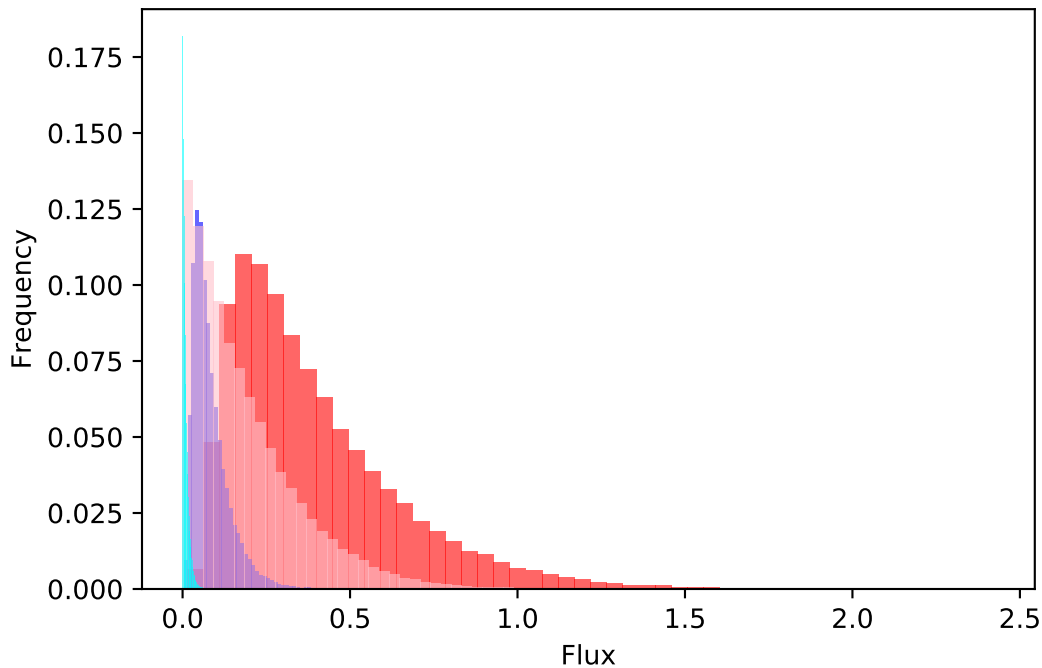
133 : H2O_h + PPi_h --> 2.0 Pi_h
['AT5G09650']
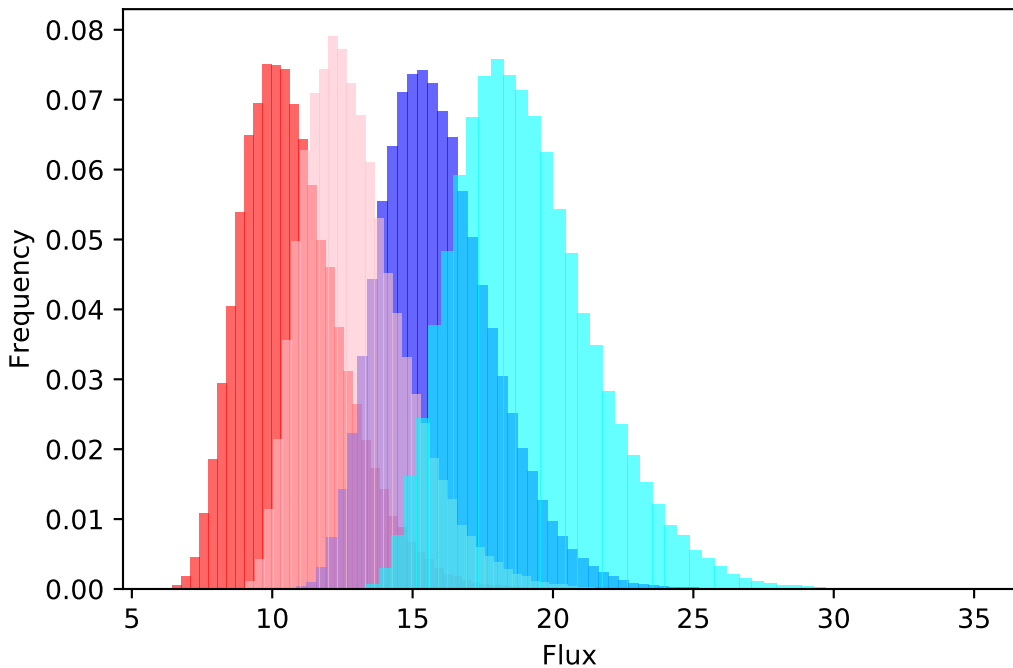
134 : H2O_c + PPi_c --> H_c + 2.0 Pi_c
['AT2G46860', 'AT1G01050', 'AT3G53620', 'AT2G18230']
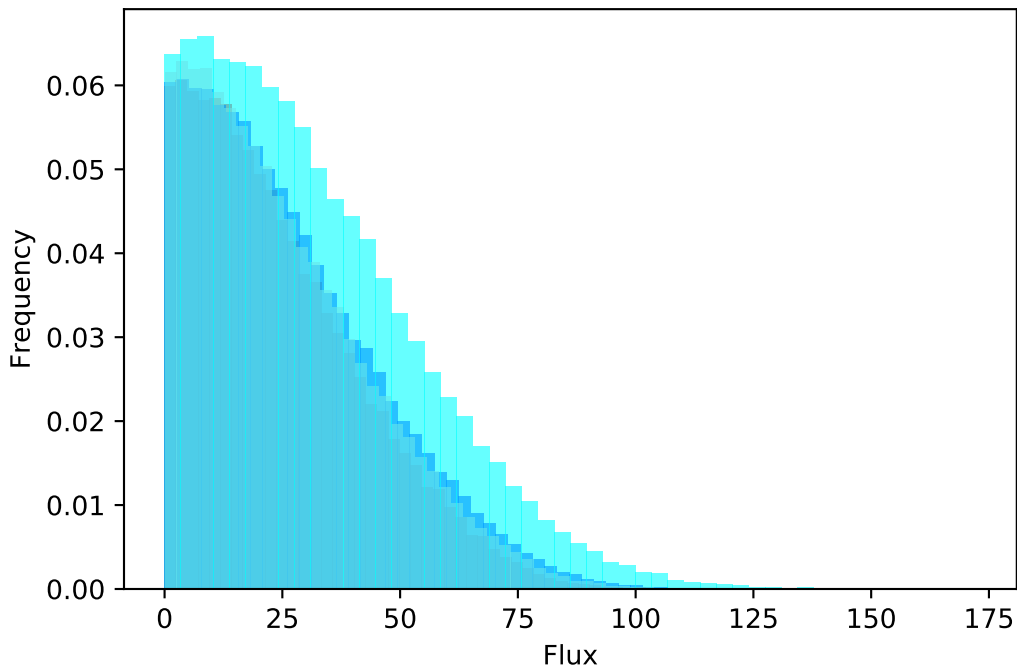
135 : F6P_c + PPi_c <=> FBP_c + H_c + Pi_c
['AT1G76550', 'AT4G04040', 'AT1G20950', 'AT1G12000']
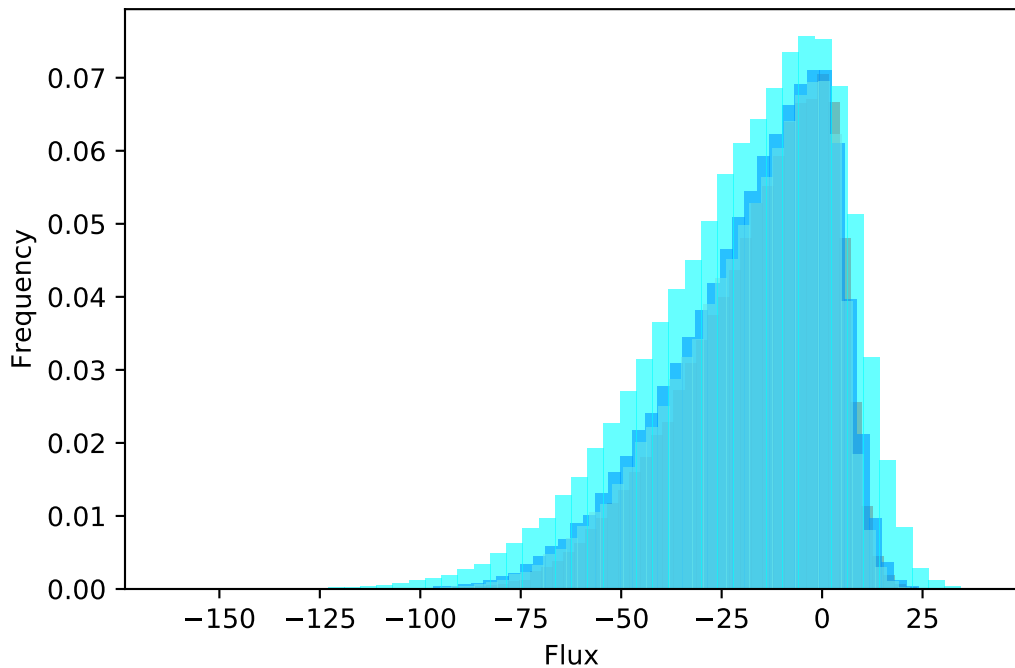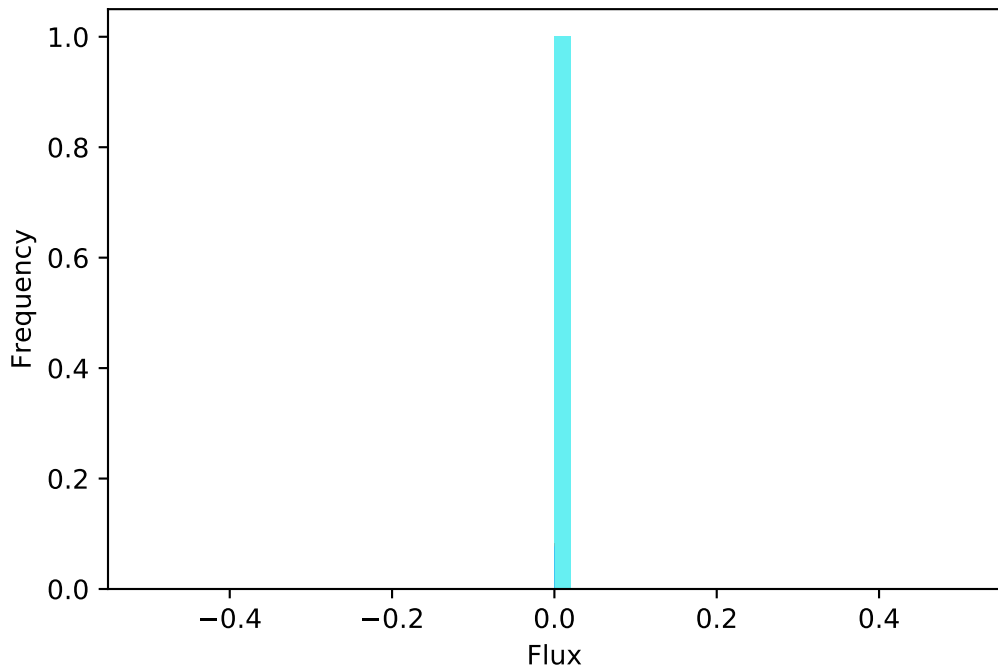
136 : CO2_h + NADH_h <=> For_h + NAD_h
['AT5G14780']
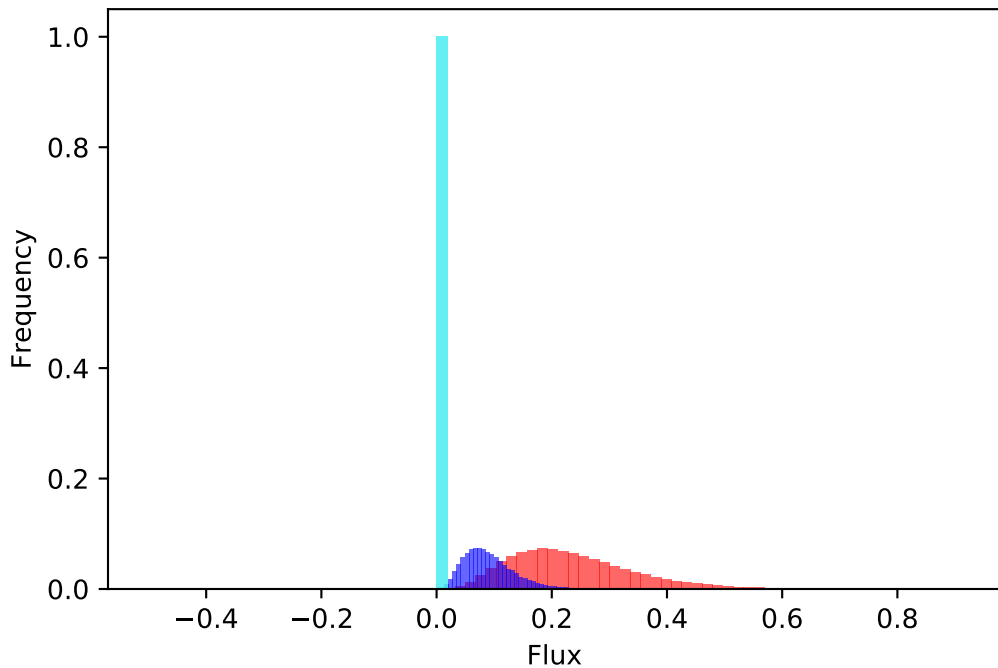
137 : ATP_h + For_h + H_h + THF_h --> ADP_h + F_DASH_THF_h + Pi_h
['AT1G50480']
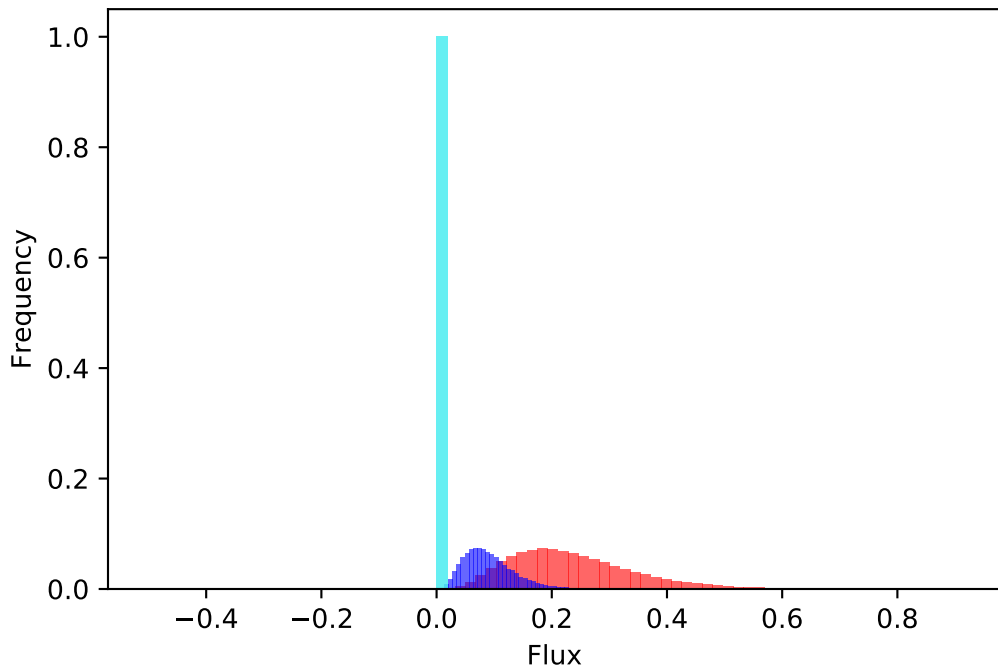
138 : DHF_c + NADPH_c --> NADP_c + THF_c
['AT2G21550', 'AT2G16370']

139 : NADPH_c + TRXox_c --> NADP_c + TRXrd_c
['AT2G41680', '2*AT4G35460', 'AT2G17420']
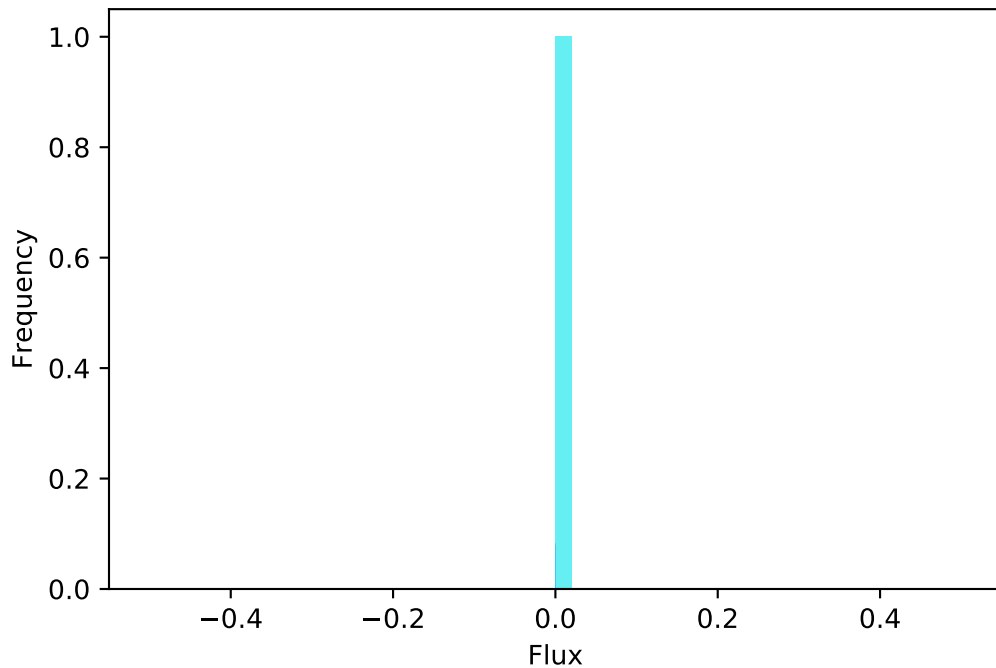
140 : ADN_c + ATP_c --> ADP_c + AMP_c + H_c
['AT3G09820', 'AT5G03300']
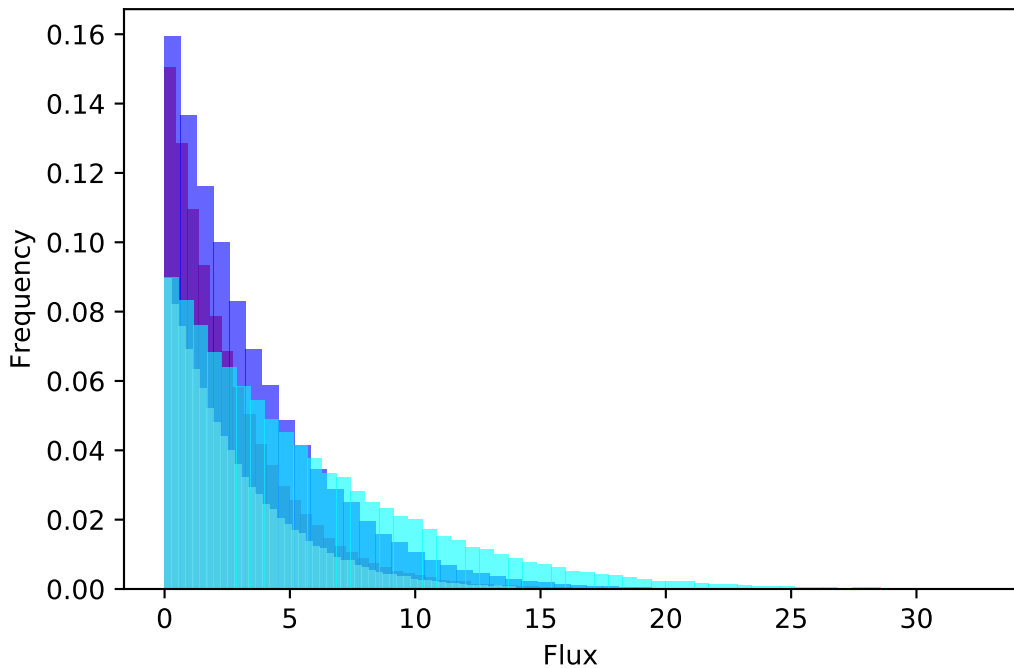
141 : ADN_c + H2O_c --> AD_c + H_c + Rib_c
['AT2G36310']
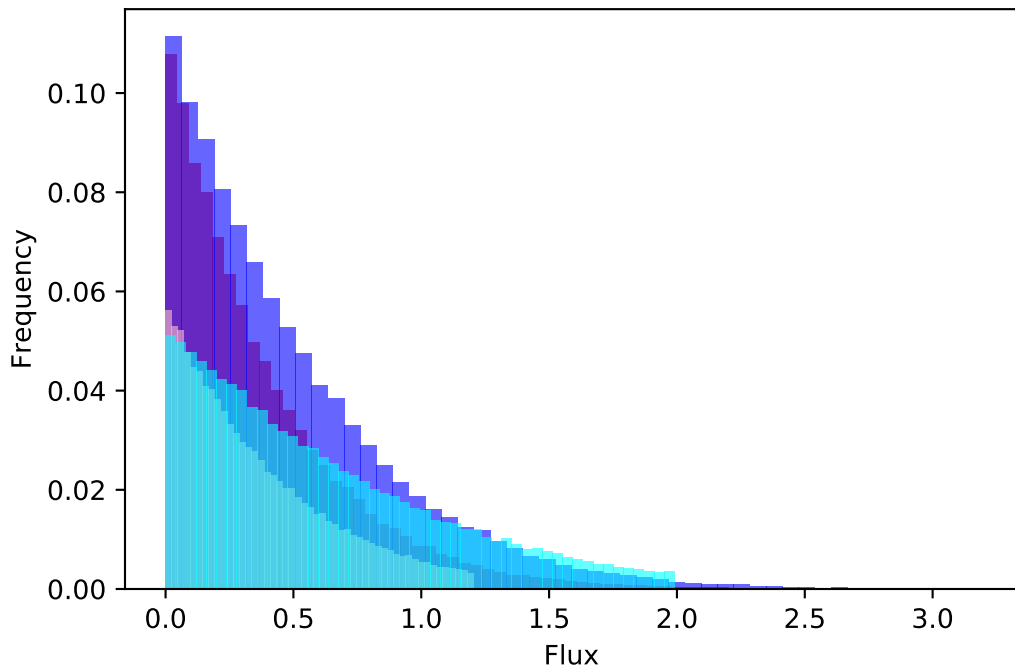
142 : AD_c + PRPP_c --> AMP_c + PPi_c
['AT1G80050', 'AT4G22570', 'AT5G11160', 'AT1G27450', '2*AT4G12440']
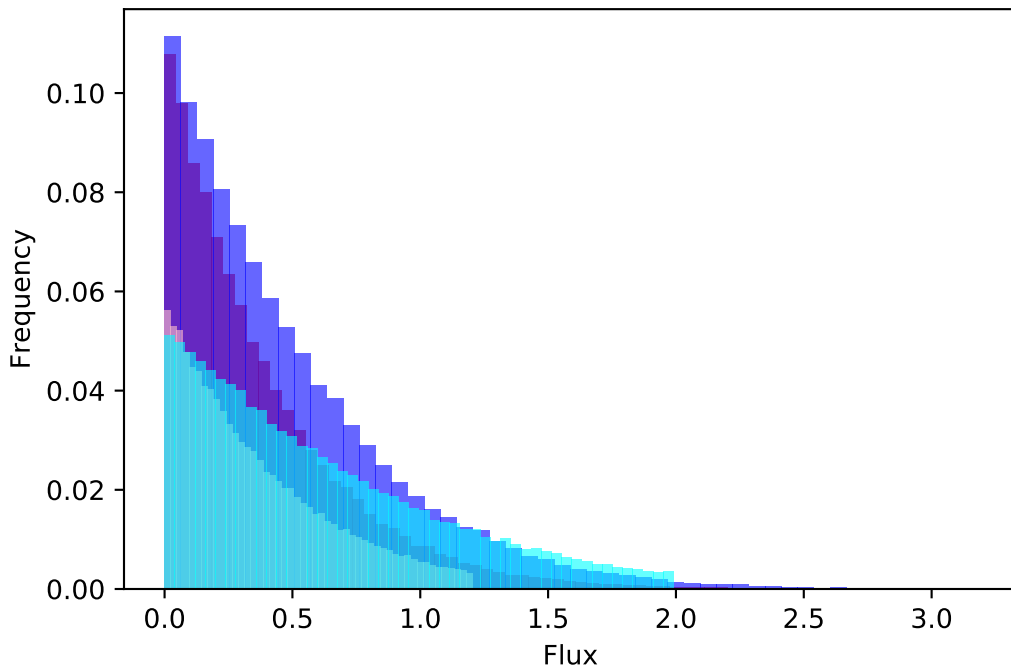
143 : ATP_h + Rib_h --> ADP_h + H_h + R5P_h
['AT1G17160']
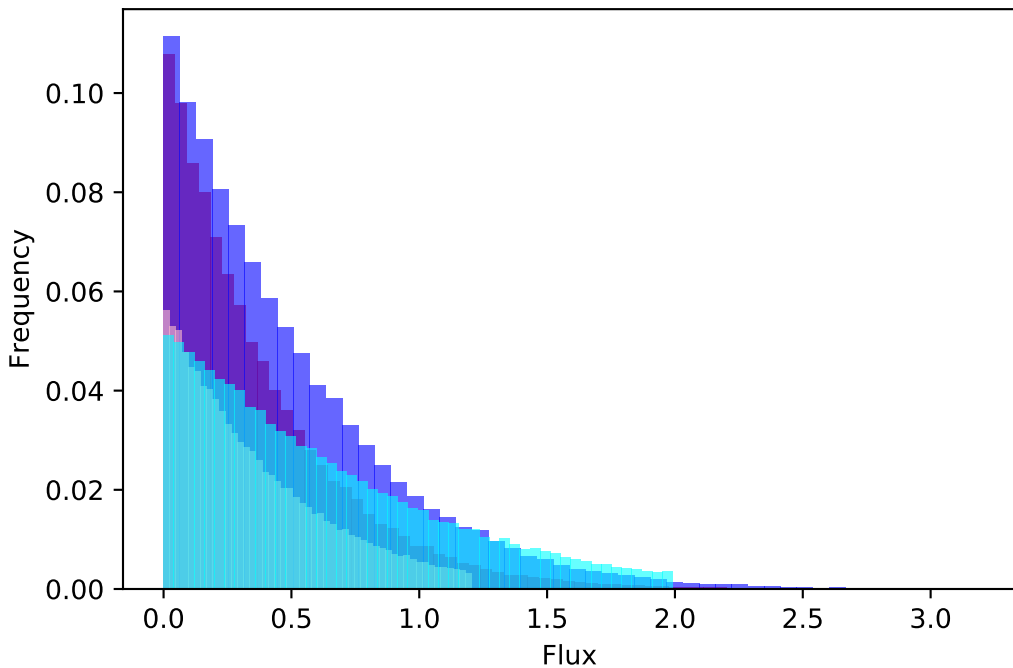
144 : NADH_c + NO3_c --> H2O_c + NAD_c + NO2_c
['2*AT1G77760', 'AT1G37130']
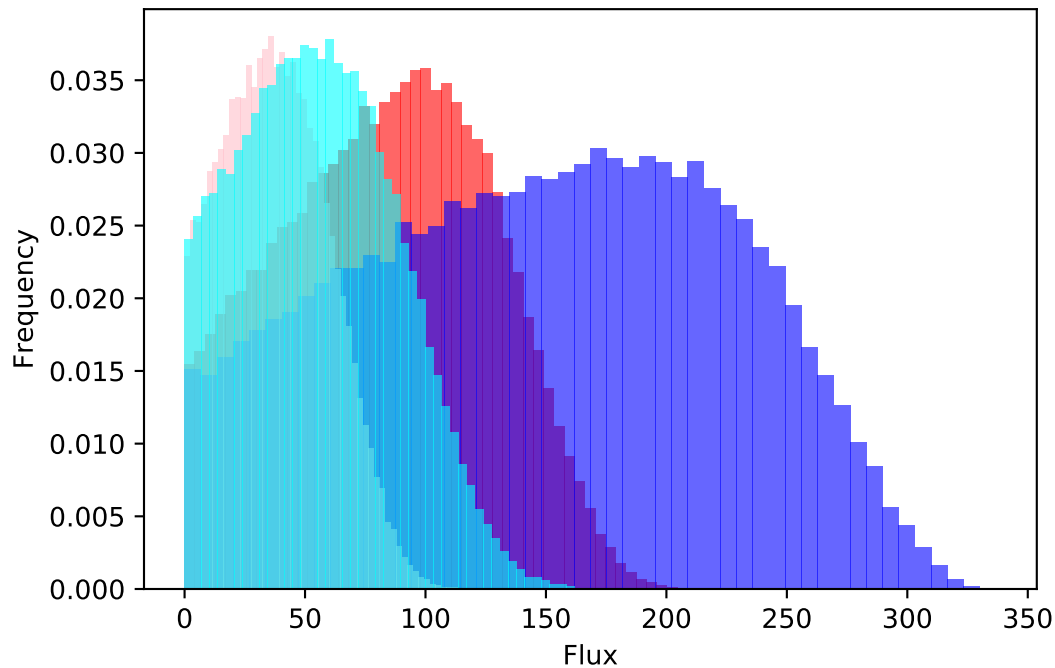
145 : NADPH_c + NO3_c <=> H2O_c + NADP_c + NO2_c
['2*AT1G77760', 'AT1G37130']
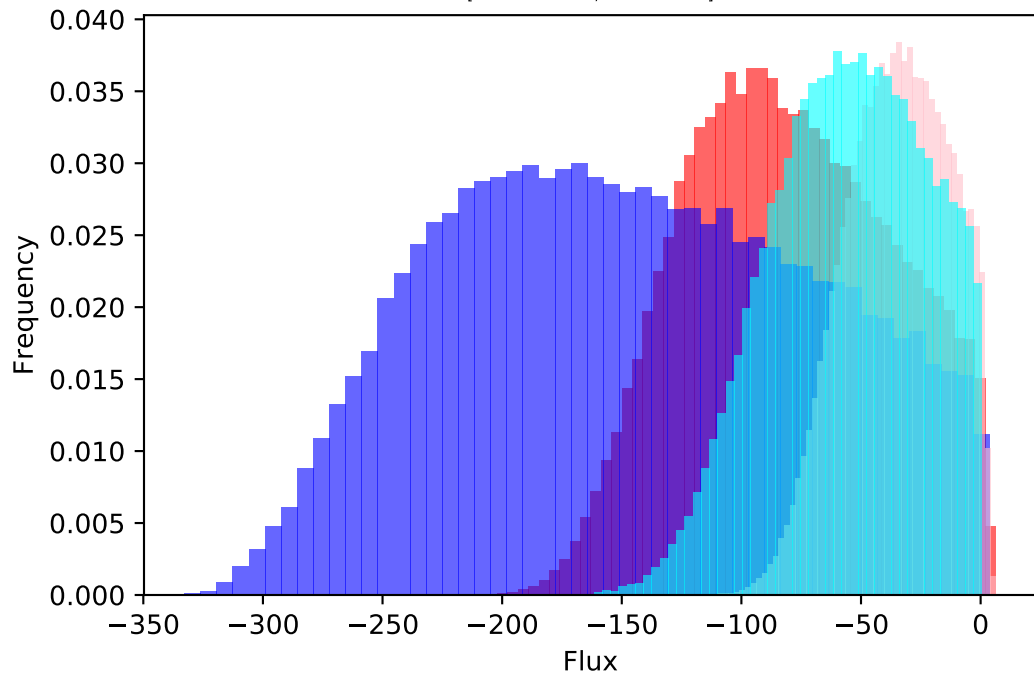
146 : 6.0 Fdrd_h + 8.0 H_h + NO2_h --> 6.0 Fdox_h + 2.0 H2O_h + NH4_h
['AT2G15620']
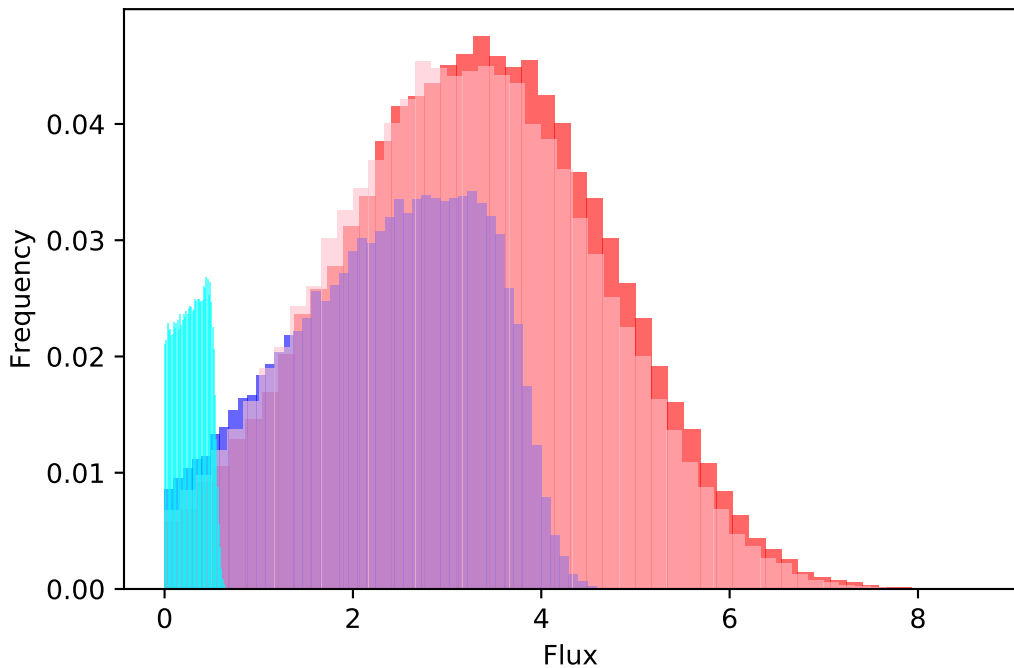
147 : ATP_h + SO4_h --> APS_h + PPi_h
['AT4G14680', 'AT5G43780', 'AT1G19920', '4*AT3G22890']
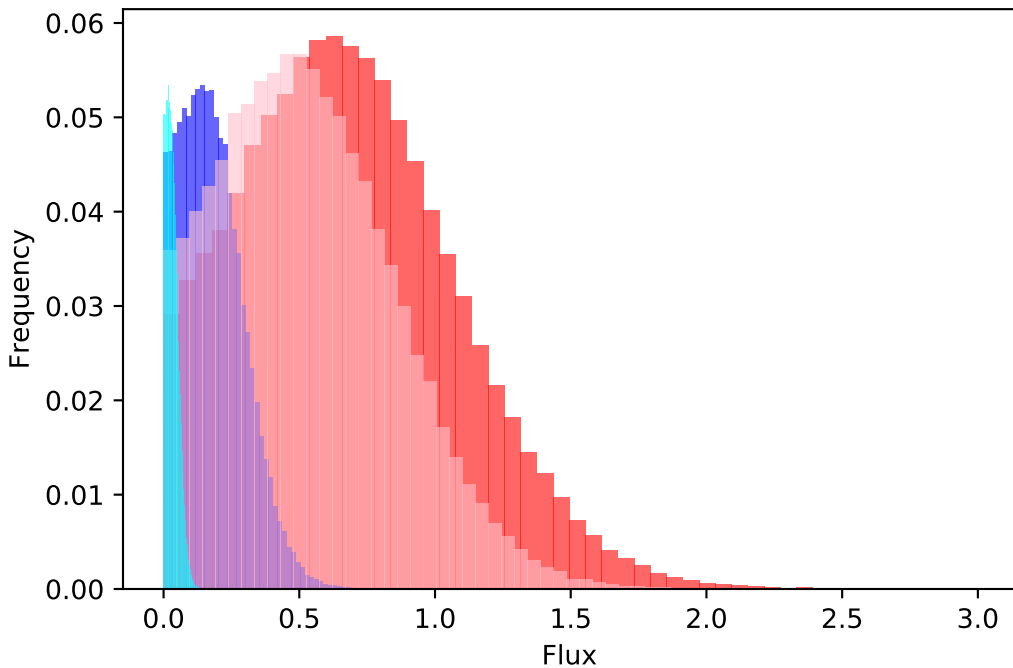
148 : APS_h + 2.0 GSH_h --> AMP_h + GSSG_h + H_h + SO3_h
['AT4G04610', 'AT4G21990', 'AT1G62180']
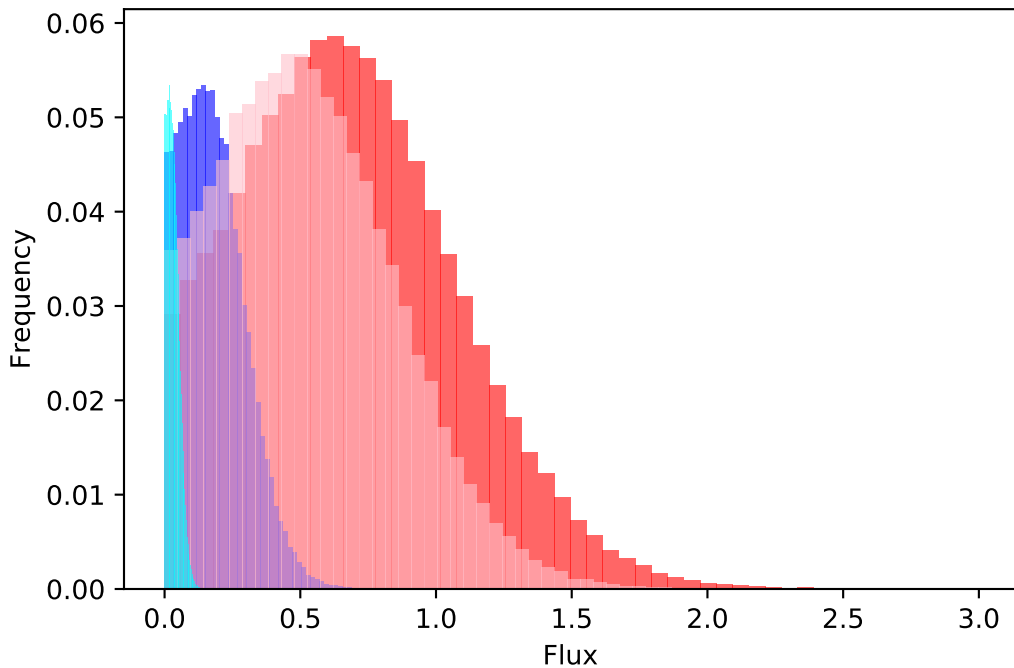
149 : GSSG_h + H_h + NADPH_h --> 2.0 GSH_h + NADP_h
['2*AT3G54660']
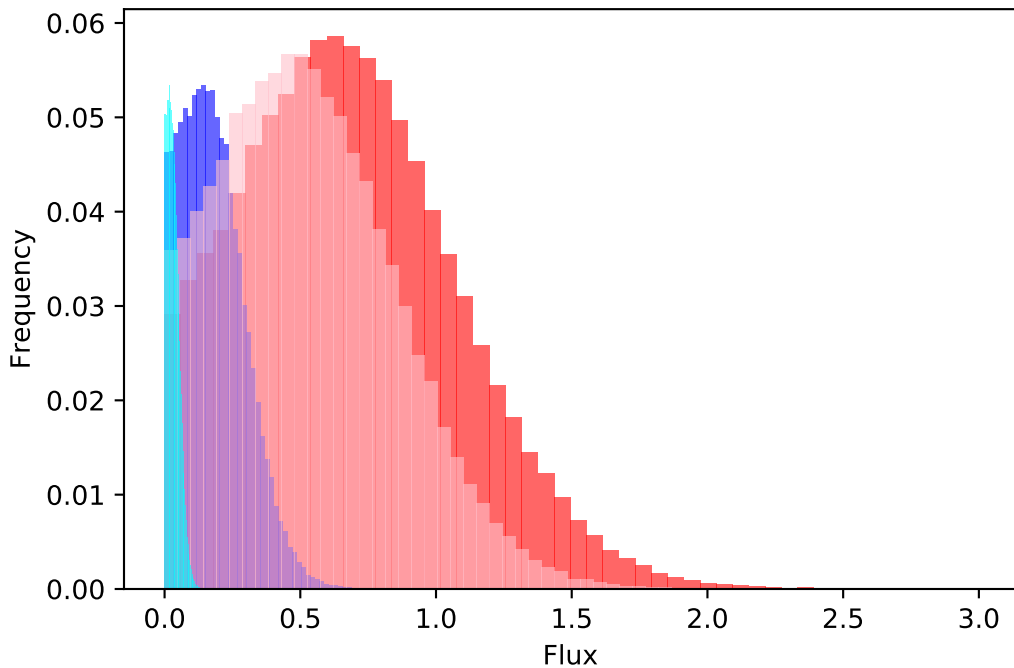
150 : 3.0 Fdrd_h + 7.0 H_h + SO3_h --> 3.0 Fdox_h + 3.0 H2O_h + H2S_h
['AT5G04590']
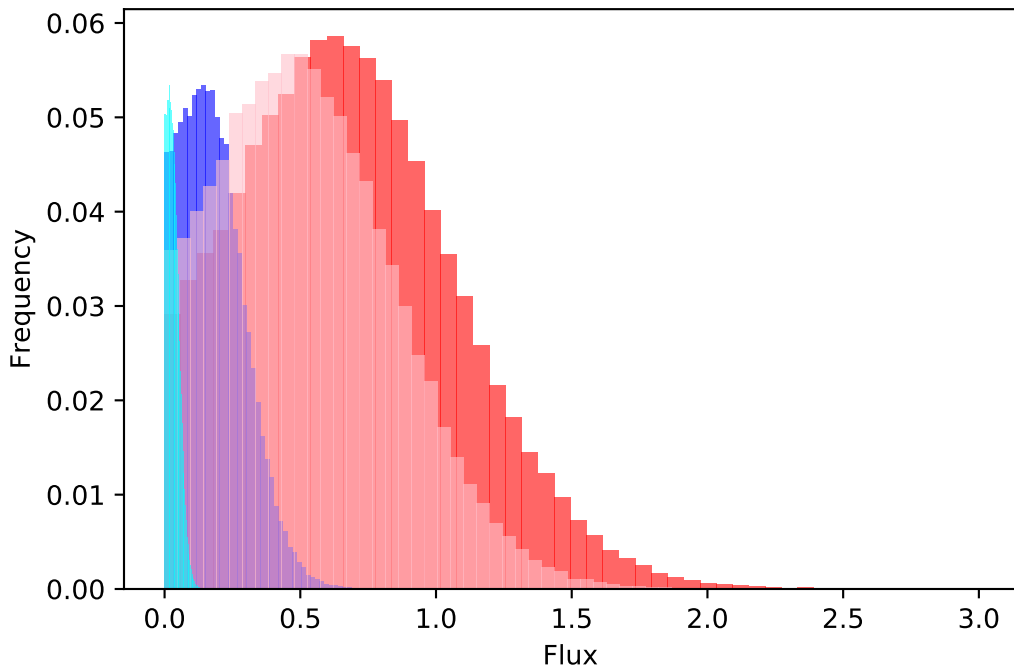
151 : CO2_c + H2O_c --> HCO3_c + H_c
['AT3G52720', '8*AT1G23730', 'AT4G20990', 'AT5G14740', 'AT2G28210', 'AT4G21000', 'AT5G04180', 'AT1G08065']
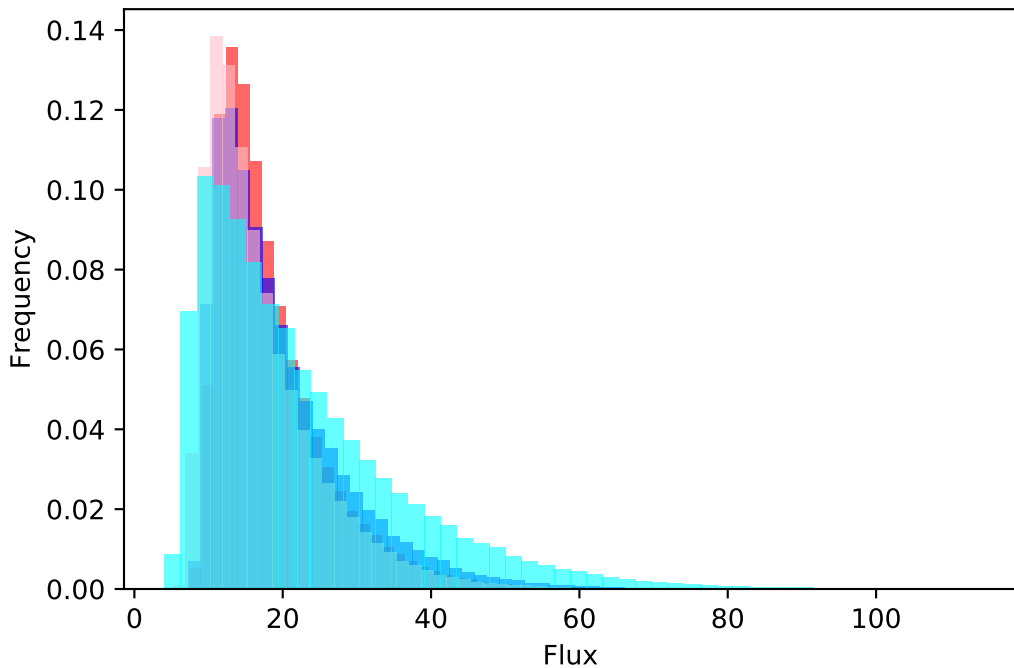
152 : CO2_h + H2O_h --> HCO3_h + H_h
['AT3G52720', 'AT4G33580', 'AT1G08080', 'AT5G14740', 'AT1G70410', 'AT4G20990', 'AT3G01500', 'AT1G58180', '8*AT1G23730']
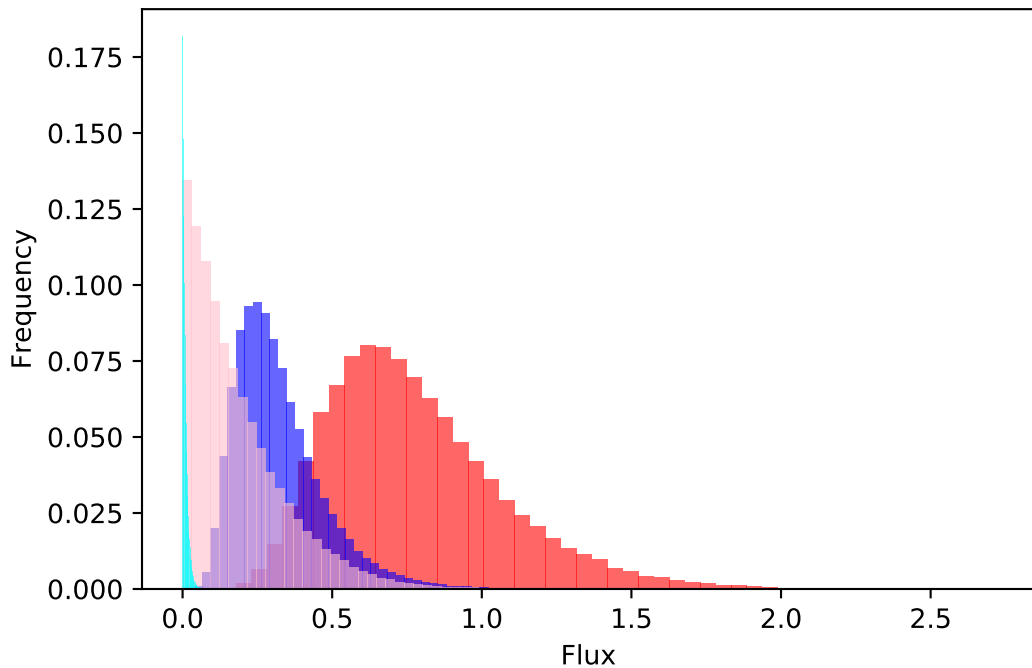
153 : Glu_h + Pyr_h <=> Ala_h + KG_h
['AT1G70580', 'AT1G23310', 'AT1G17290']
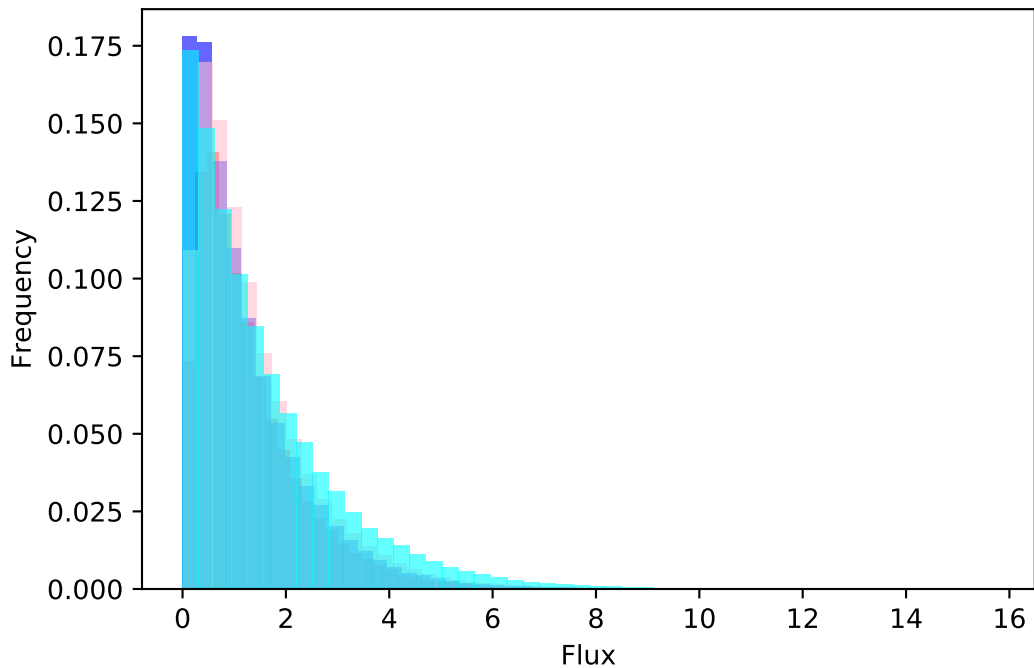
154 : Glu_m + Pyr_m <=> Ala_m + KG_m
['AT1G72330', 'AT1G17290']
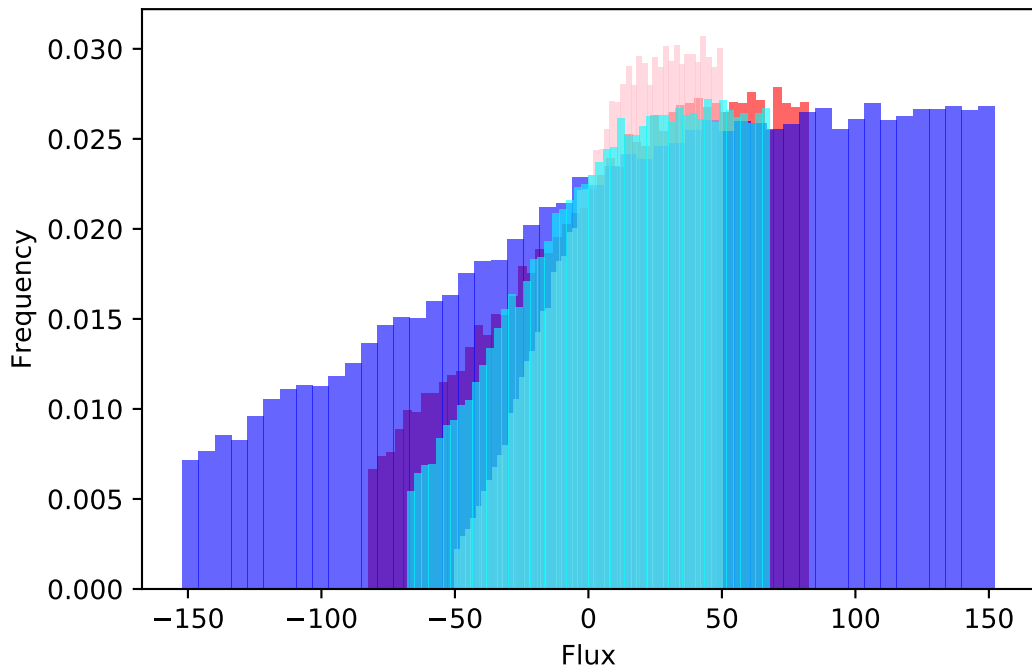
155 : Glu_p + Pyr_p <=> Ala_p + KG_p
['AT1G70580', 'AT1G23310']
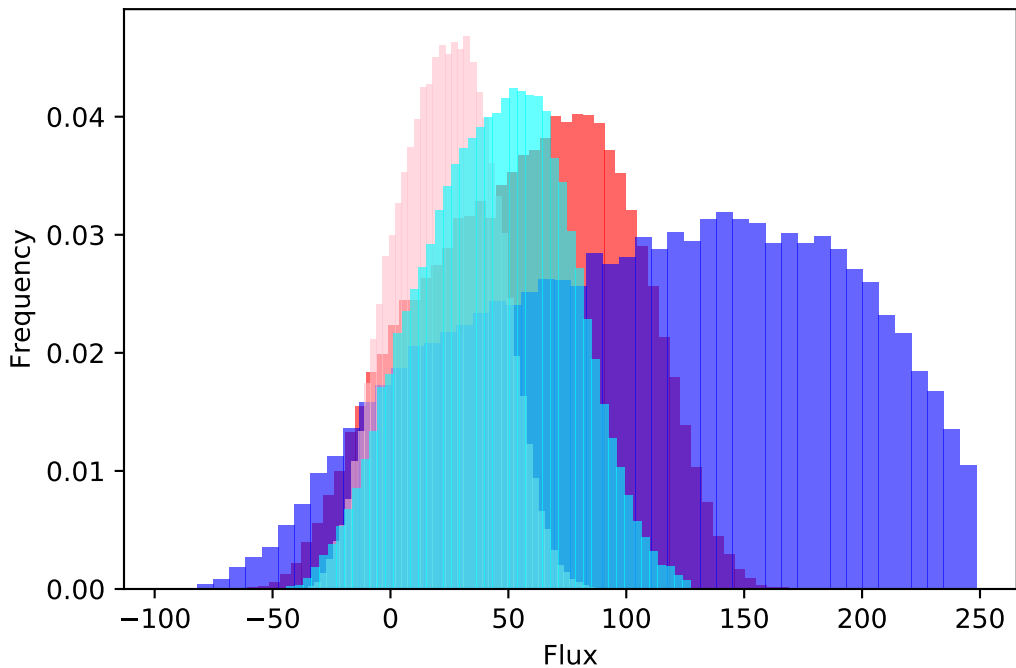
156 : ATP_h + A_DASH_Glu_h --> ADP_h + A_DASH_GluP_h
['6*AT3G57560']
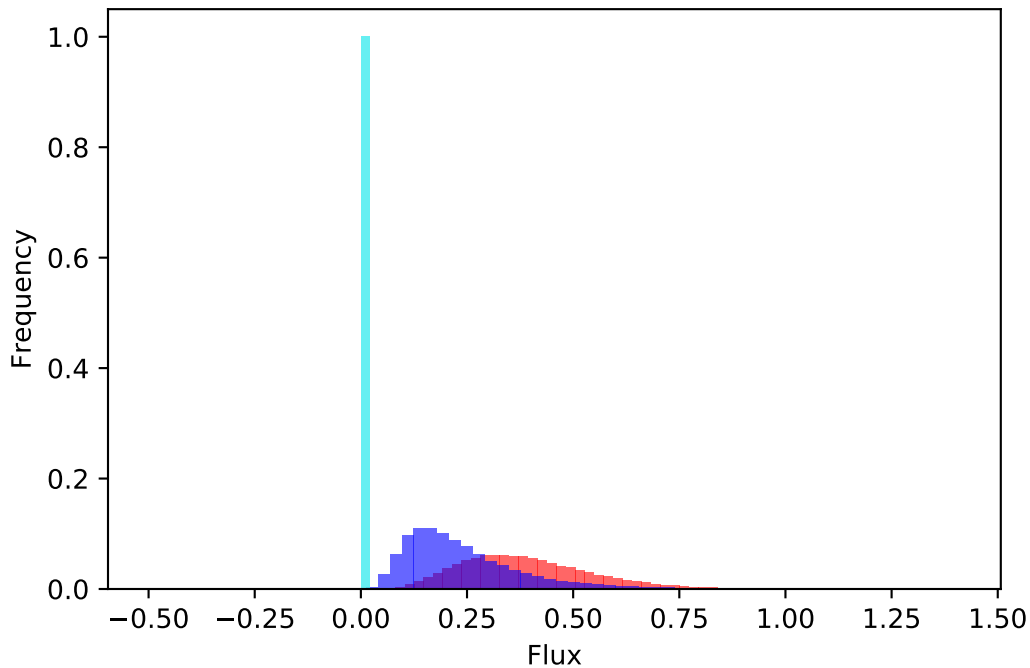
157 : A_DASH_GluP_h + H_h + NADPH_h --> A_DASH_Glu_DASH_SeA_h + NADP_h + Pi_h
['AT2G19940']
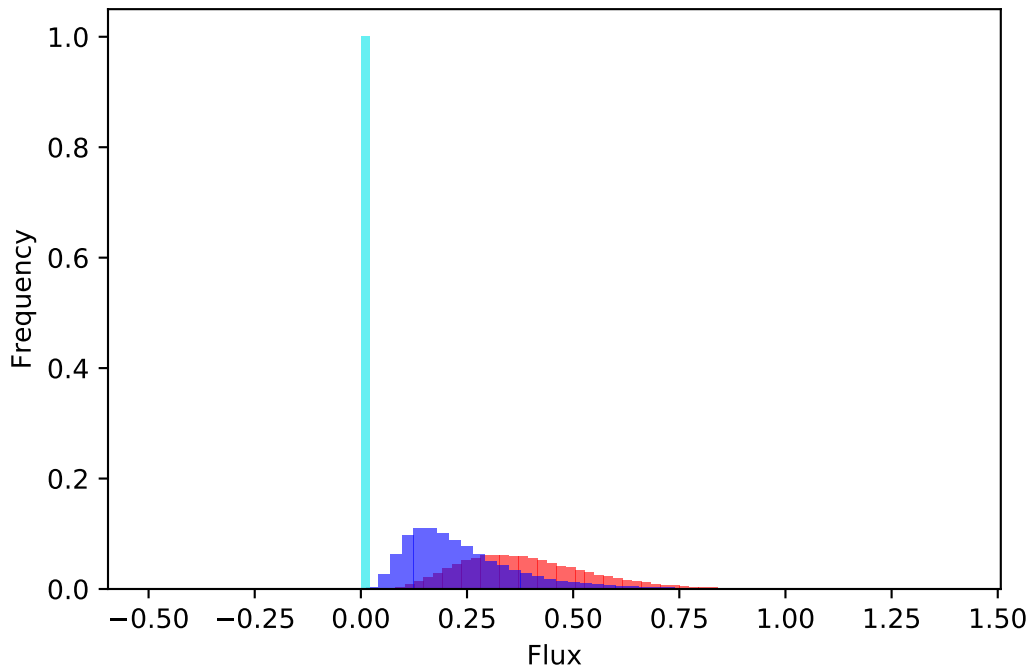
158 : A_DASH_Glu_DASH_SeA_h + Glu_h --> A_DASH_Orn_h + KG_h
['AT1G80600']
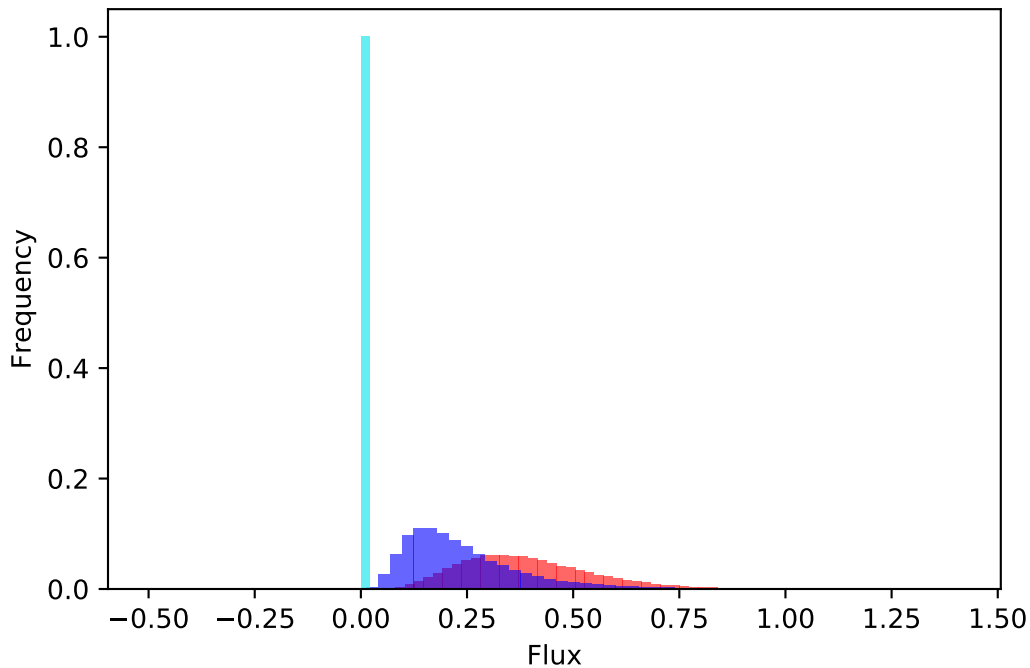
159 : A_DASH_Orn_h + Glu_h --> A_DASH_Glu_h + Orn_h
['AT2G37500']
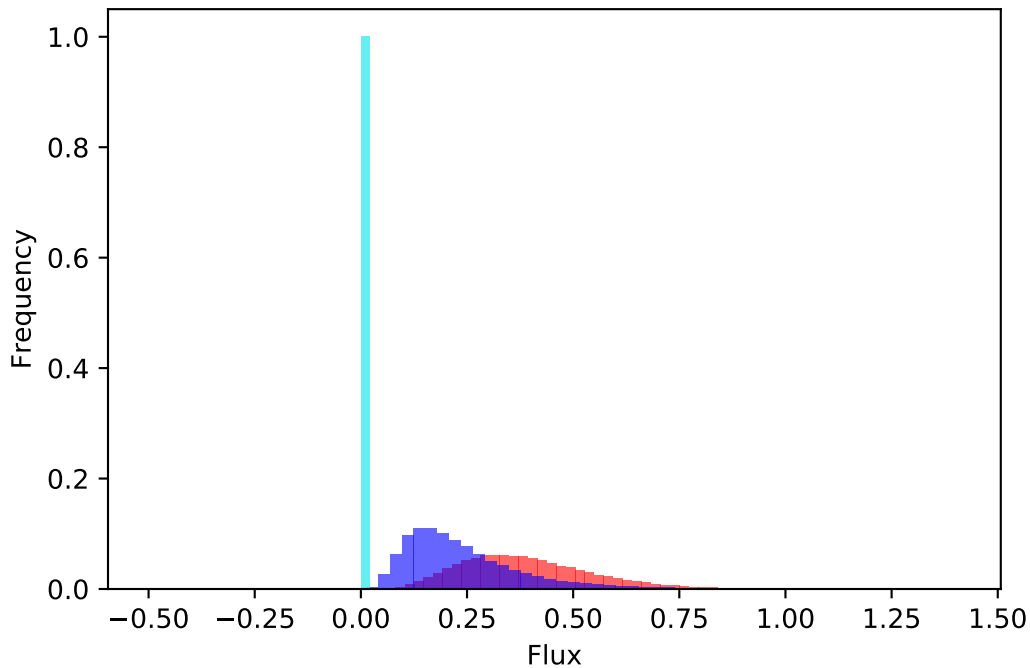
160 : 2.0 ATP_h + Gln_h + H2O_h + HCO3_h --> 2.0 ADP_h + CBP_h + Glu_h + 3.0 H_h + Pi_h
['AT1G29900', 'AT3G27740']
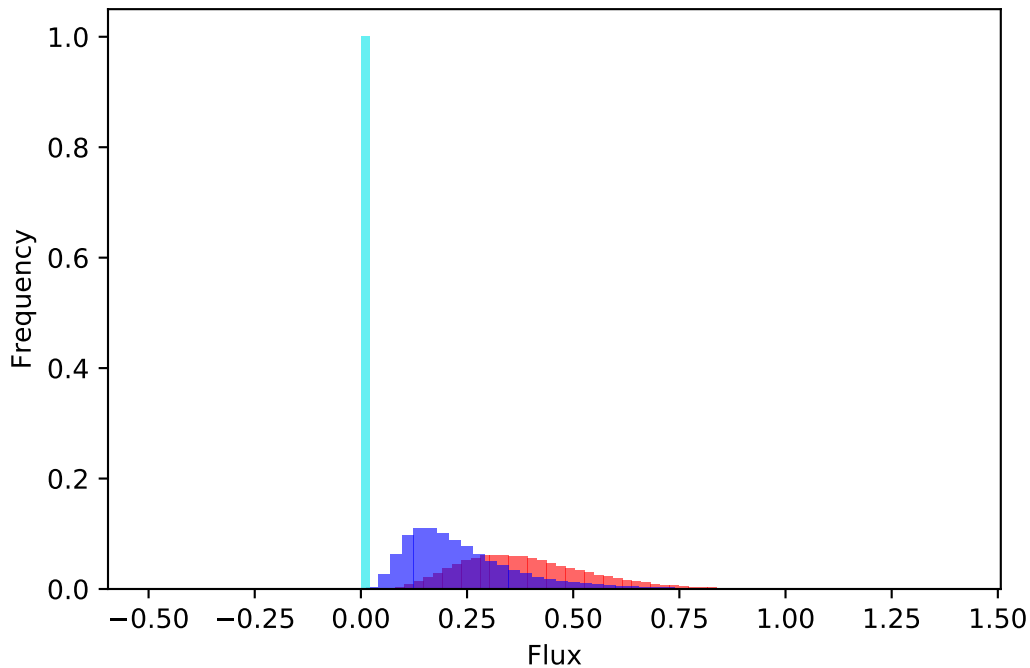
161 : CBP_h + H_h + Orn_h <=> CTL_h + Pi_h
['AT1G75330']
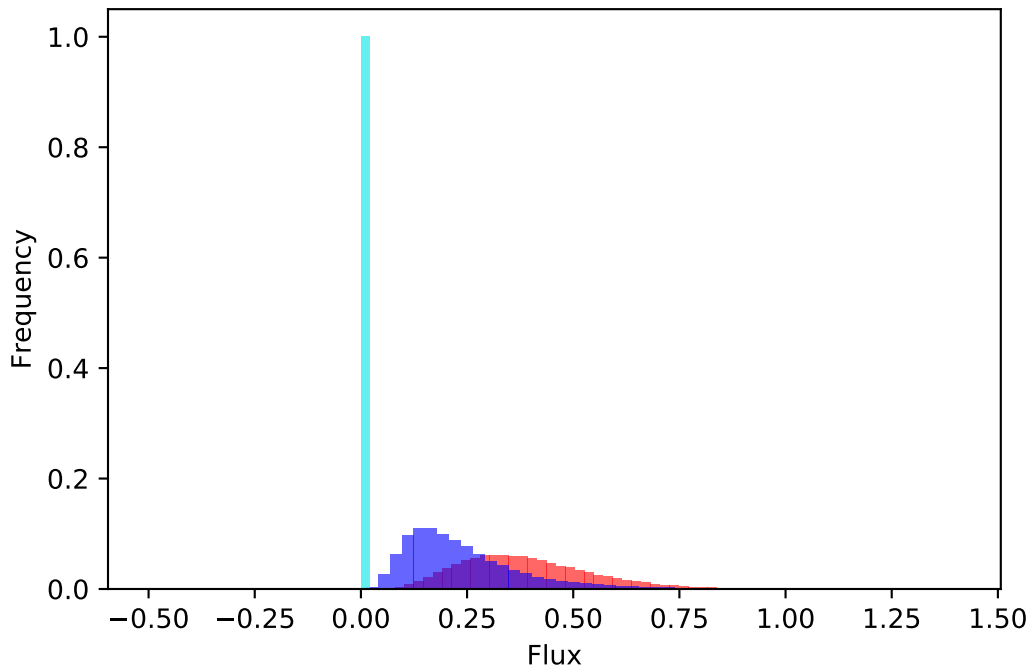
162 : ATP_h + Asp_h + CTL_h --> AMP_h + Arg_DASH_SCA_h + 3.0 H_h + PPi_h
['AT4G24830']
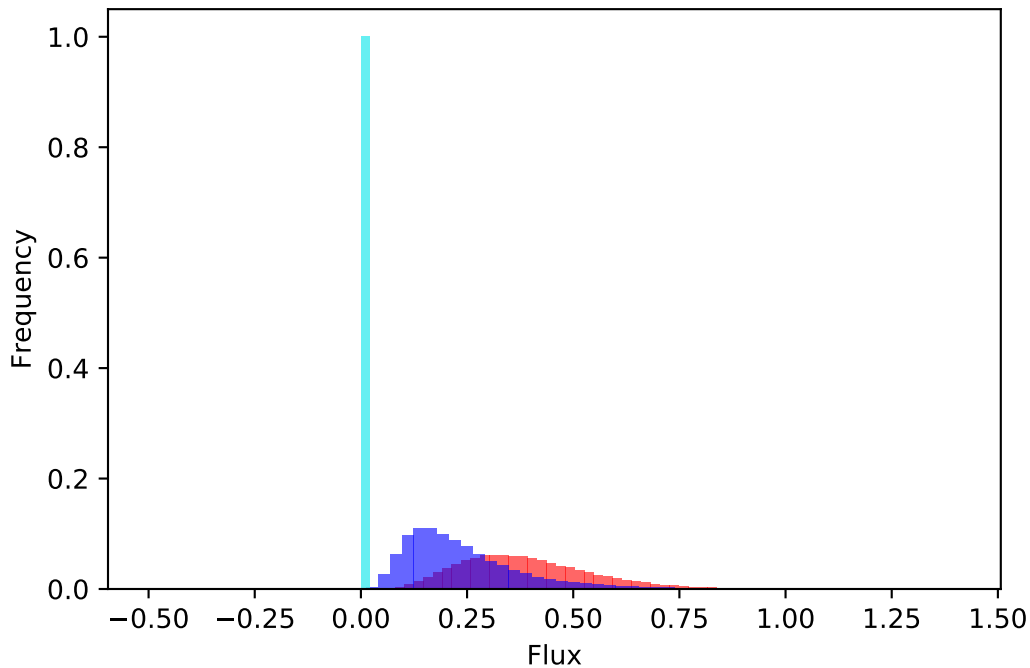
163 : Arg_DASH_SCA_h --> Arg_h + Fum_h
['AT5G10920']
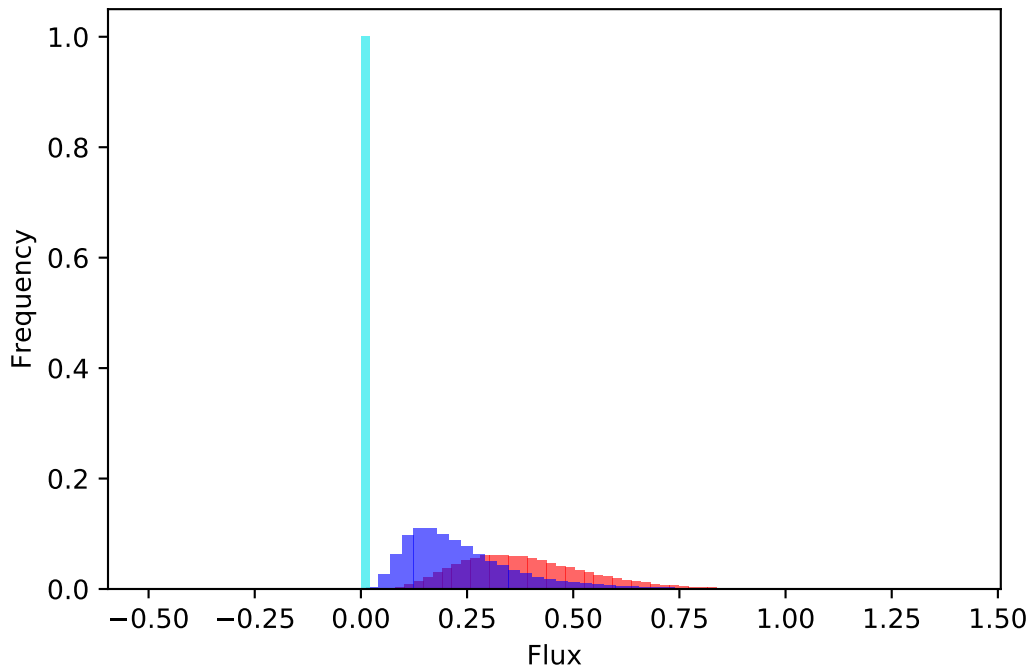
164 : Mal_c --> Fum_c + H2O_c
['AT5G50950']
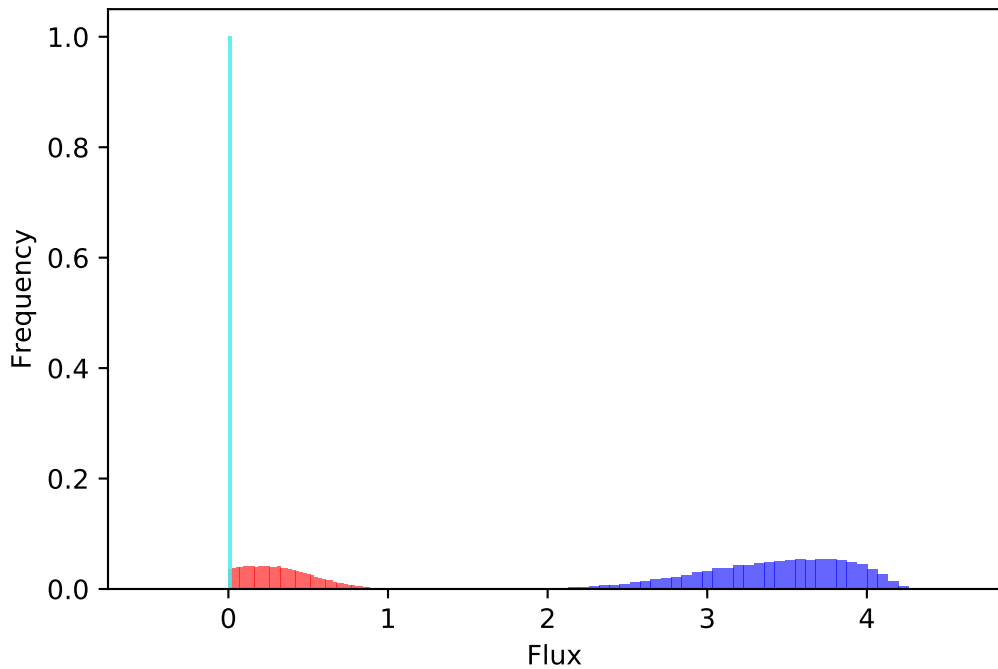
165 : ATP_c + Asp_c + Gln_c + H2O_c --> AMP_c + Asn_c + Glu_c + H_c + PPi_c
['AT3G47340', 'AT5G10240', 'AT5G65010']
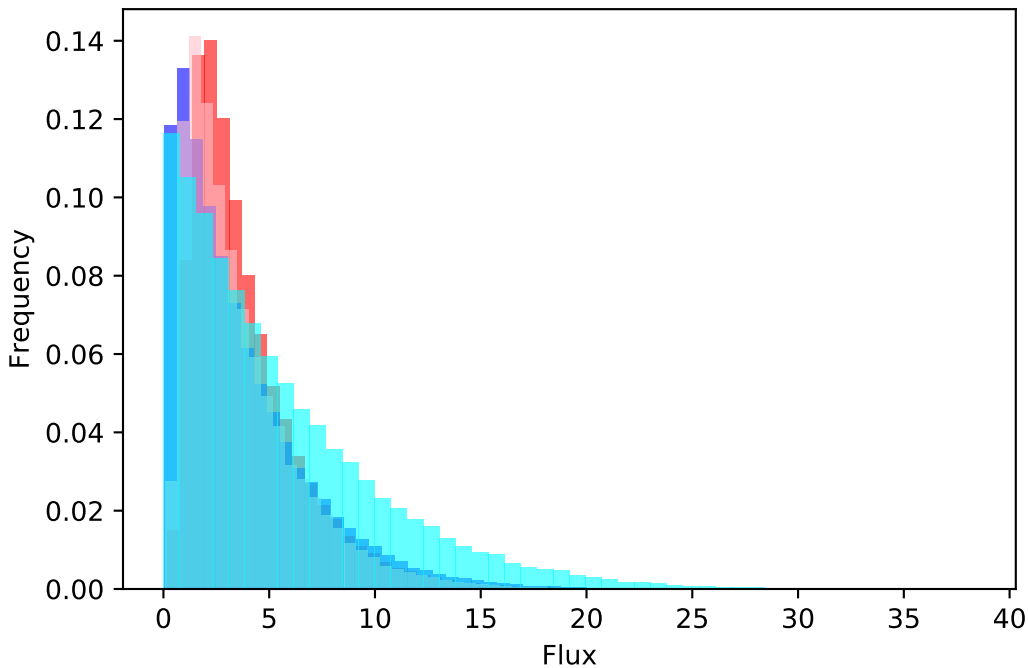
166 : Glu_c + OAA_c <=> Asp_c + KG_c
['AT5G51690', 'AT1G62800', 'AT5G19550', 'AT1G62960']
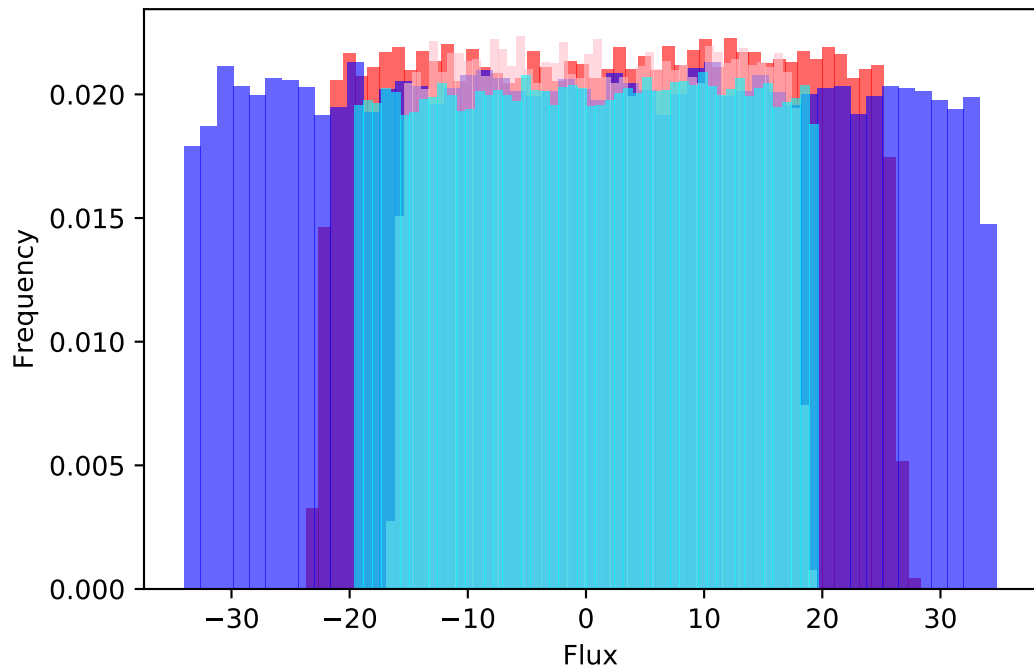
167 : Glu_h + OAA_h <=> Asp_h + KG_h
['AT4G31990', 'AT2G22250']
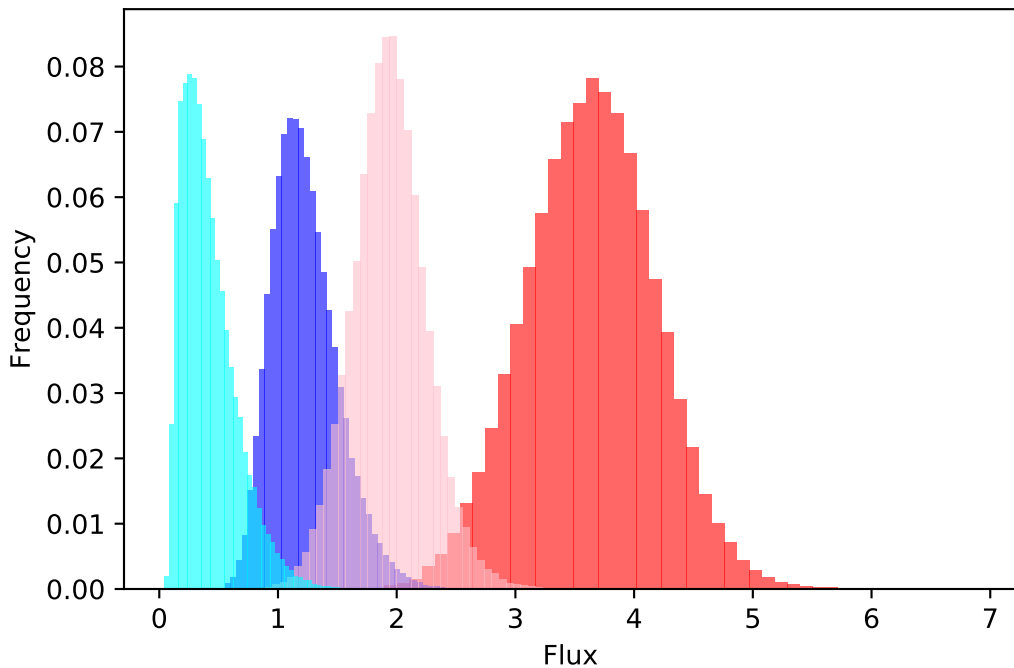
168 : Glu_m + OAA_m <=> Asp_m + KG_m
['AT5G11520', 'AT2G30970']
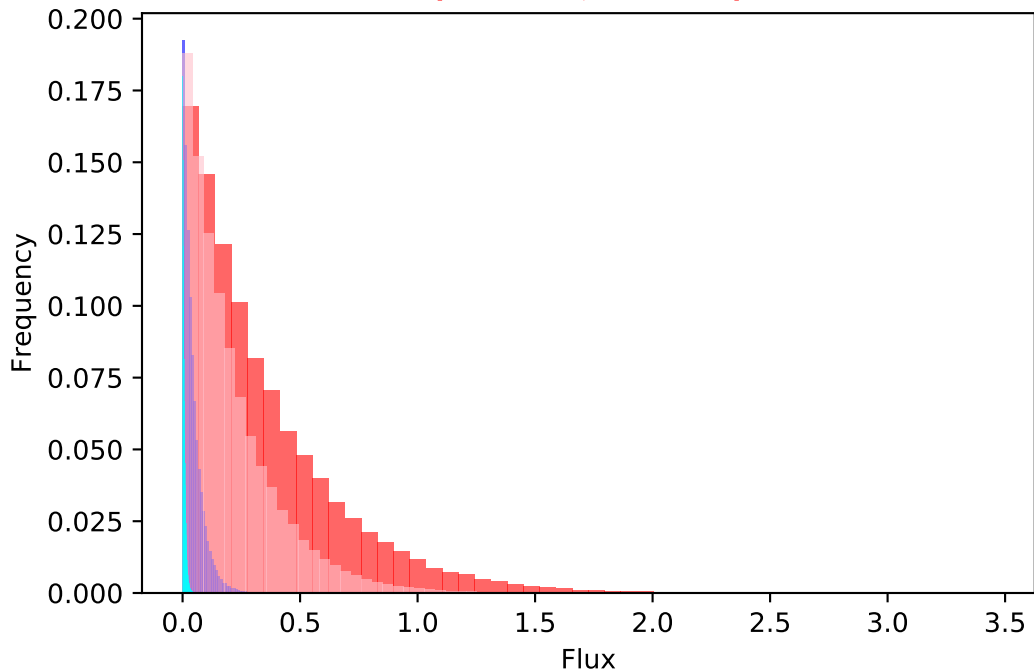
169 : Glu_p + OAA_p <=> Asp_p + KG_p
['AT5G11520']
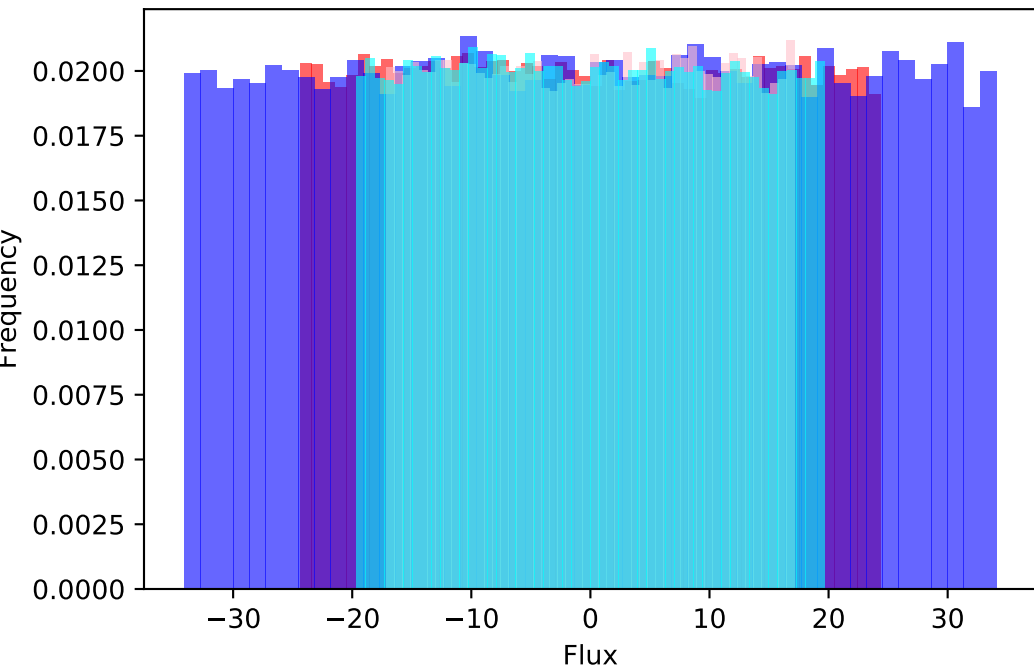
170 : Asn_c + H2O_c --> Asp_c + NH4_c
['2*AT3G16150', '2*AT5G08100']
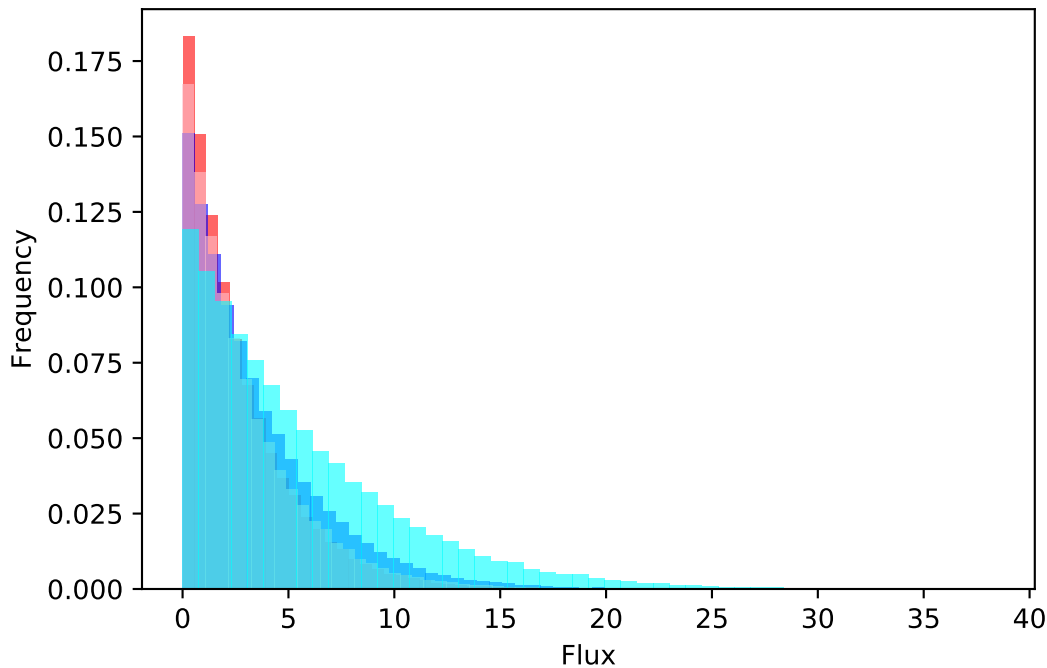
171 : A_DASH_CoA_c + Ser_c --> A_DASH_Ser_c + CoA_c
['AT4G35640', '6*AT1G55920', 'AT5G56760', 'AT3G13110', 'AT2G17640']
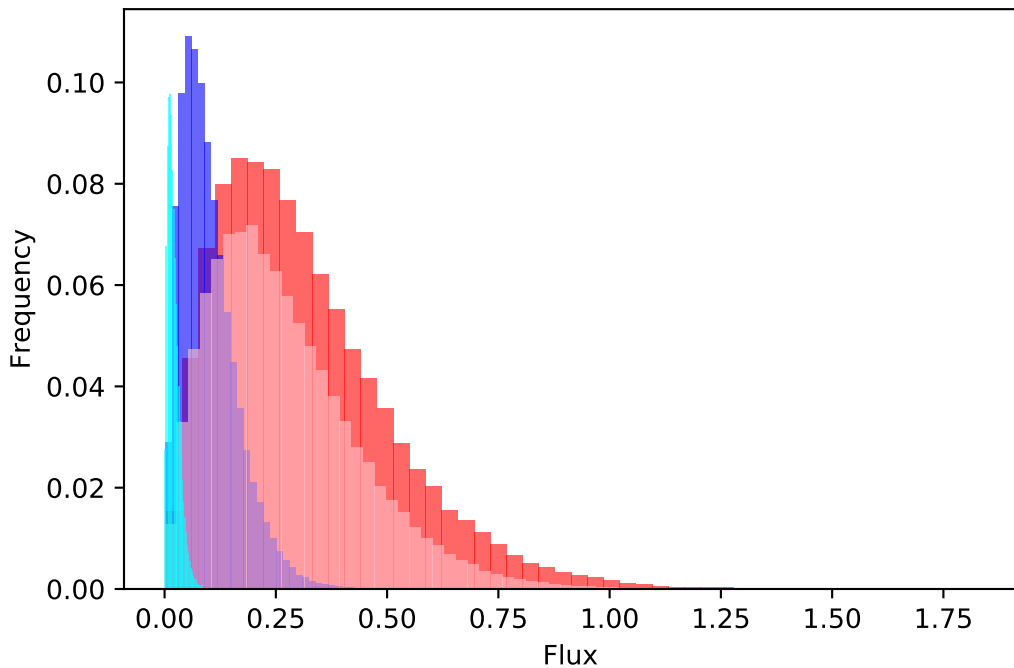
172 : A_DASH_CoA_h + Ser_h --> A_DASH_Ser_h + CoA_h
['AT3G13110', '6*AT1G55920']
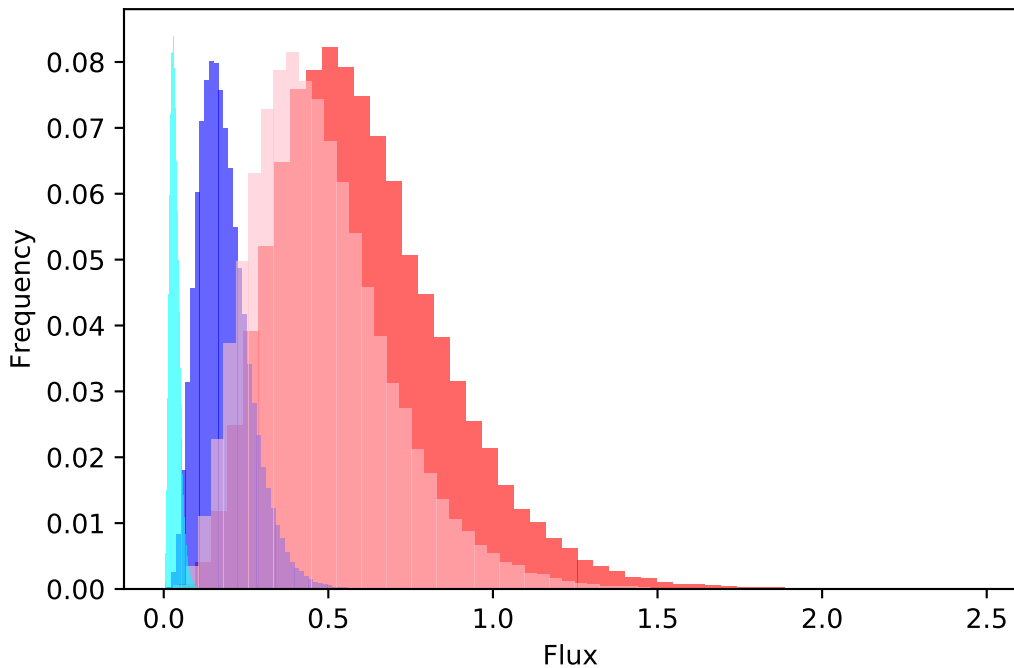
173 : A_DASH_CoA_m + Ser_m --> A_DASH_Ser_m + CoA_m
['6*AT1G55920', 'AT3G13110']
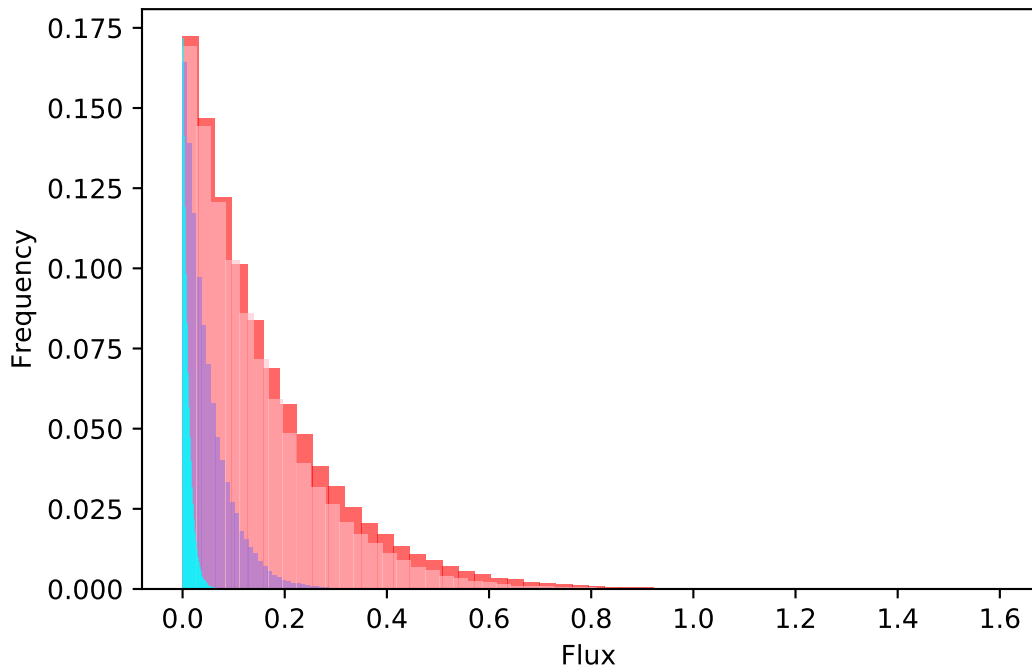
174 : A_DASH_Ser_c + H2S_c --> AC_c + Cys_c + H_c
['2*AT4G14880', 'AT3G22460']
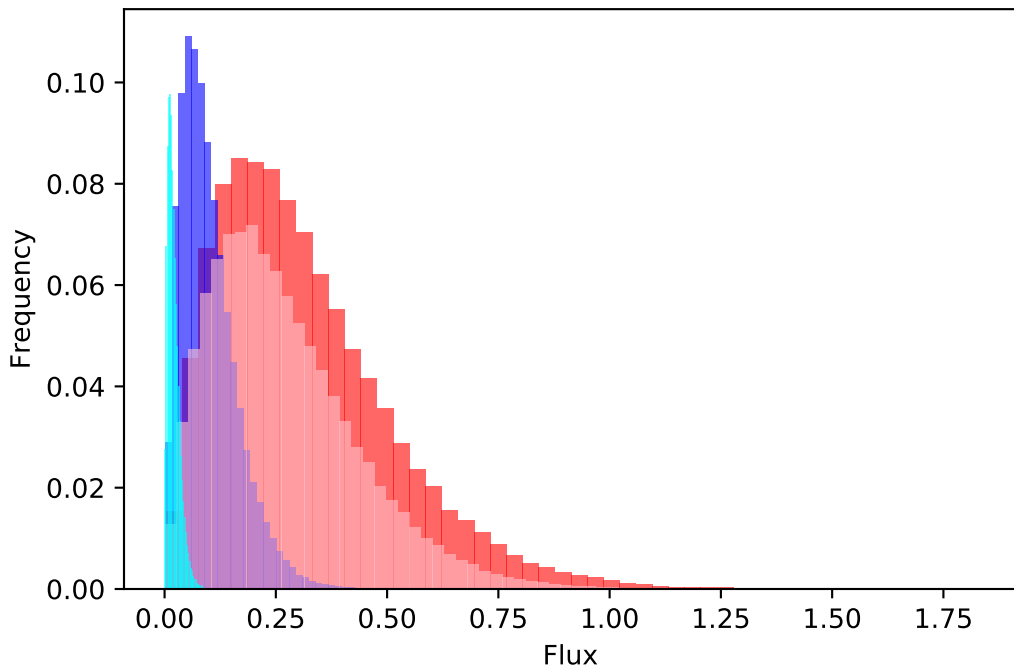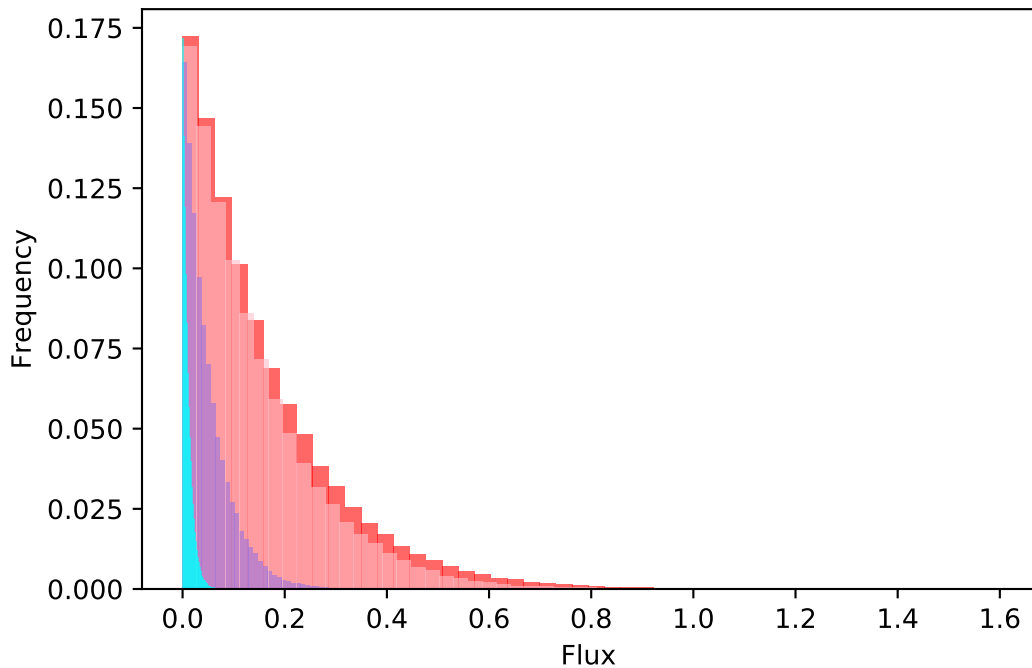
175 : A_DASH_Ser_h + H2S_h --> AC_h + Cys_h + H_h
['AT2G43750', 'AT4G14880', 'AT3G03630', '2*AT3G61440']
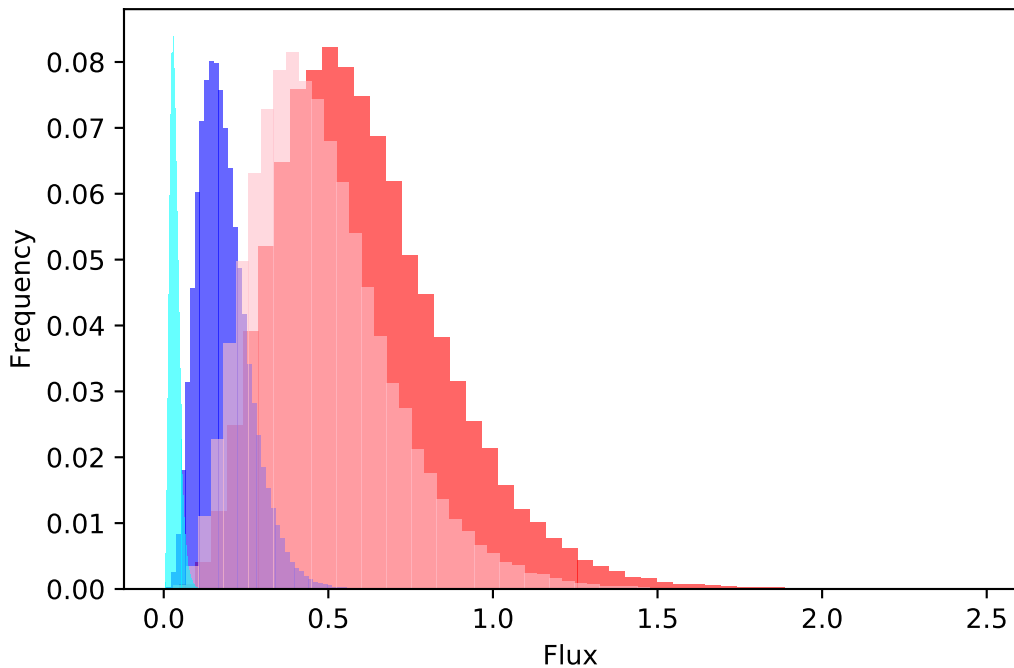
176 : A_DASH_Ser_m + H2S_m --> AC_m + Cys_m + H_m
['AT2G43750', '2*AT3G61440', 'AT5G28020', 'AT3G03630']

177 : Gln_h + H_h + KG_h + NADPH_h <=> 2.0 Glu_h + NADP_h
['AT5G53460']
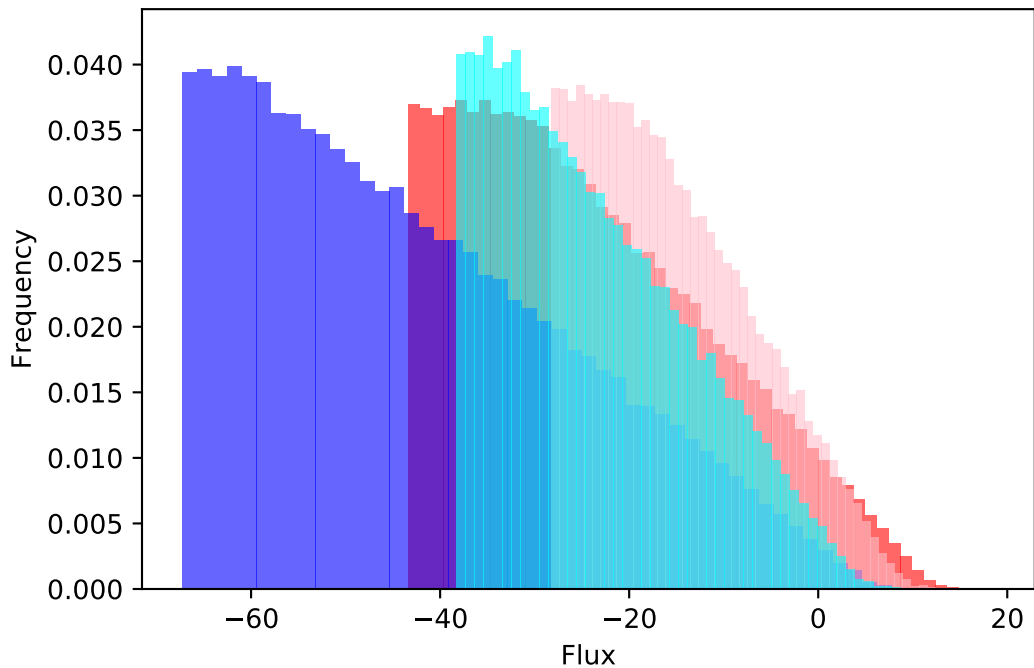
178 : Glu_c + H2O_c + NADP_c <=> KG_c + NADPH_c + NH4_c
['AT1G51720']
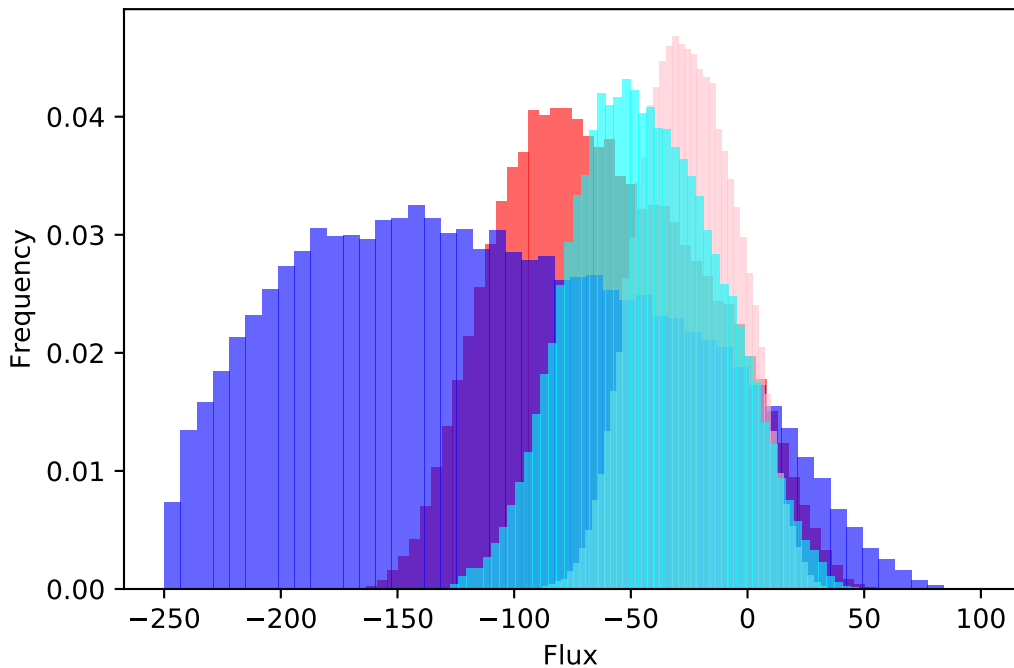
179 : Gln_c + H2O_c --> Glu_c + NH4_c
['AT5G60540']
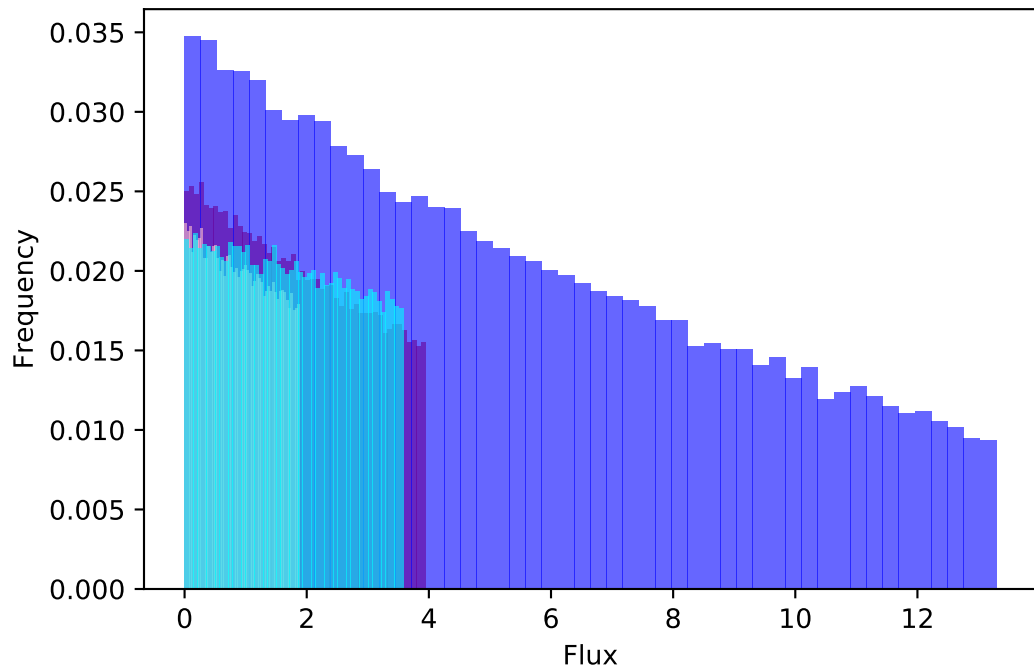
180 : Gln_h + H_h + KG_h + NADH_h --> 2.0 Glu_h + NAD_h
['AT5G53460']
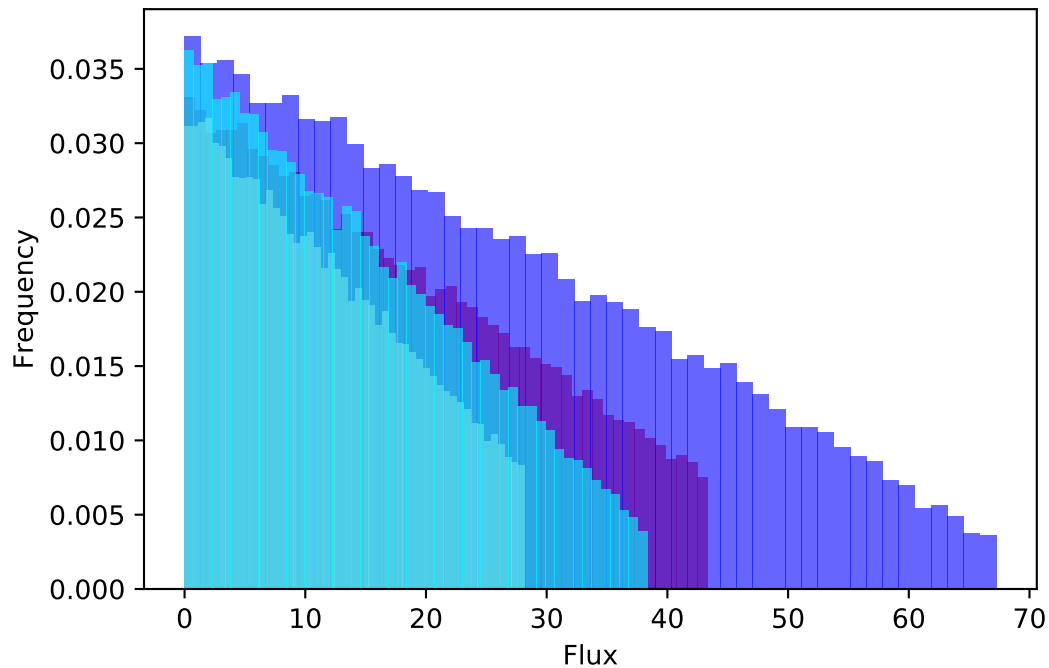
181 : 2.0 Fdrd_h + Gln_h + 2.0 H_h + KG_h --> 2.0 Fdox_h + 2.0 Glu_h
['AT2G41220', 'AT5G04140']
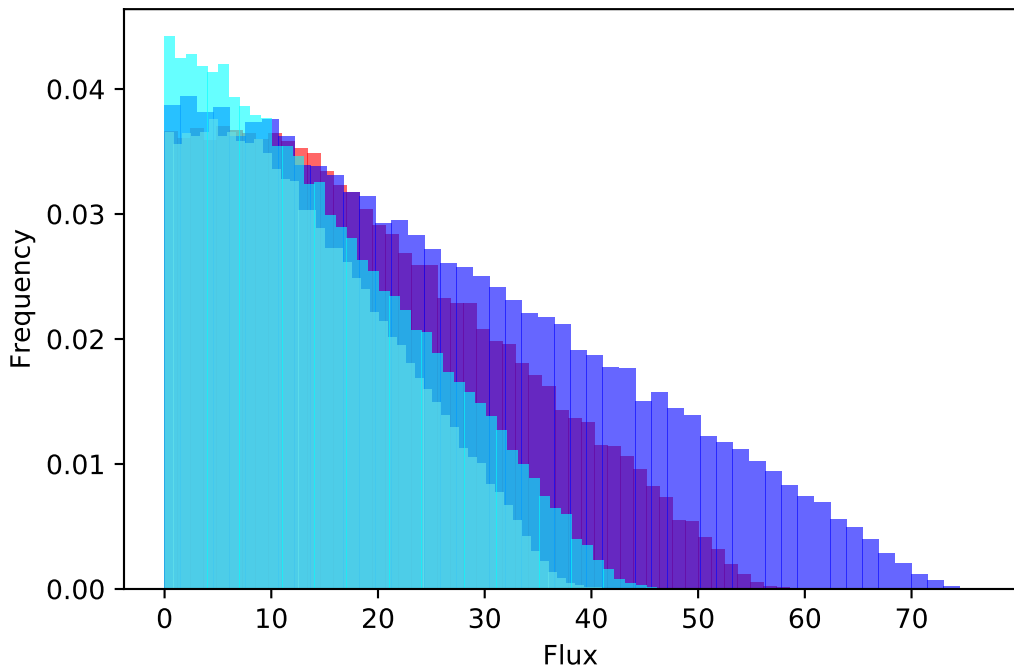
182 : H_m + KG_m + NADH_m + NH4_m --> Glu_m + H2O_m + NAD_m
['6*AT5G18170', 'AT5G07440', 'AT3G03910']
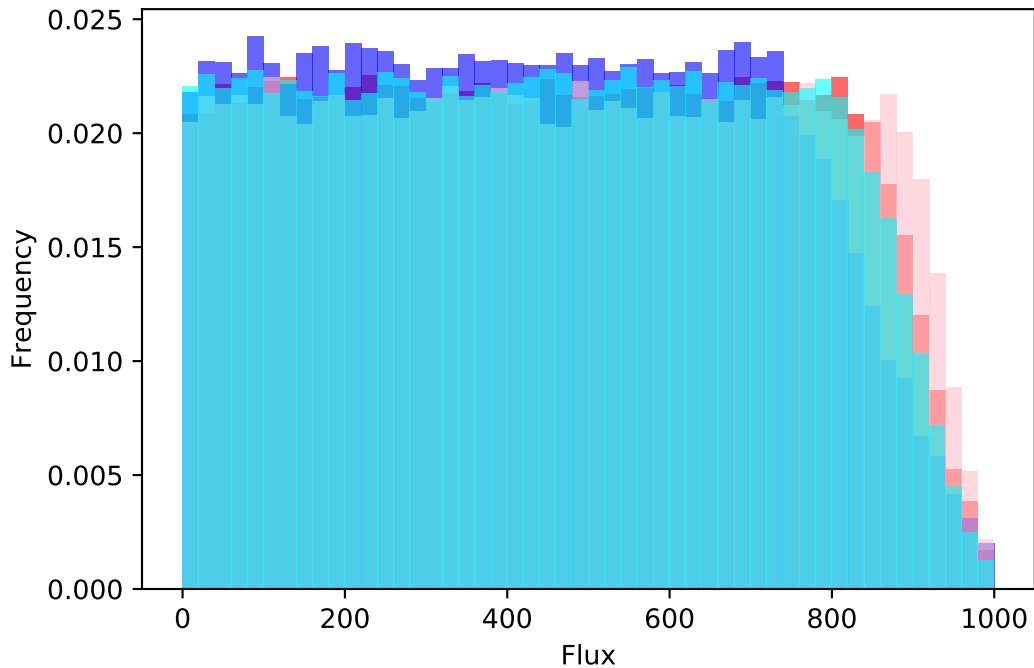
183 : H_m + KG_m + NADPH_m + NH4_m <=> Glu_m + H2O_m + NADP_m
['6*AT5G18170', 'AT5G07440', 'AT3G03910']
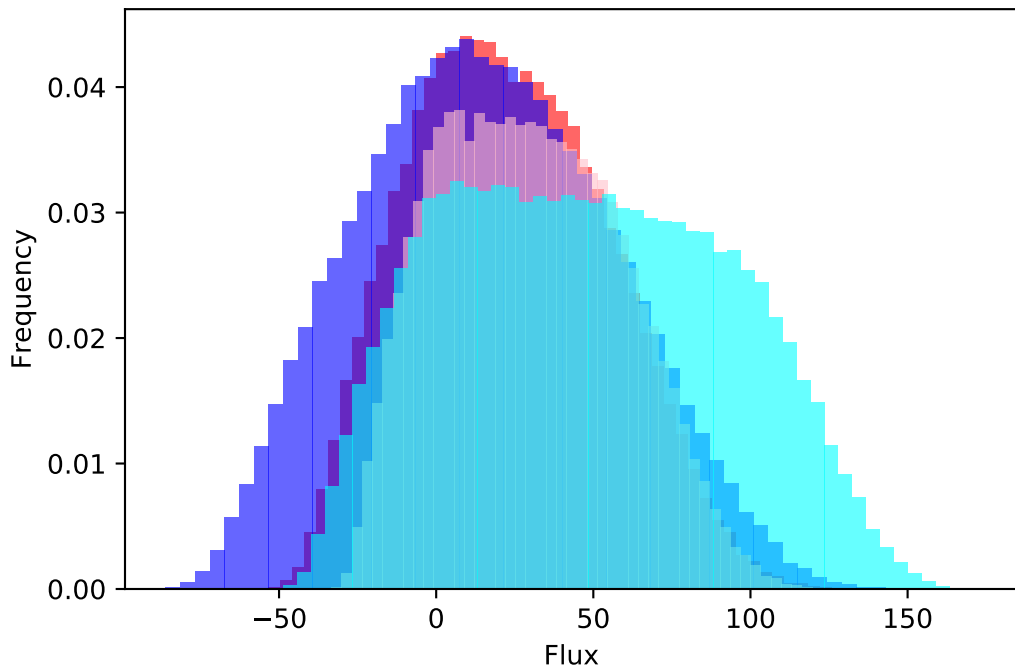
184 : Glu_m + H2O_m + NAD_m --> H_m + KG_m + NADH_m + NH4_m
['6*AT5G18170', 'AT5G07440']
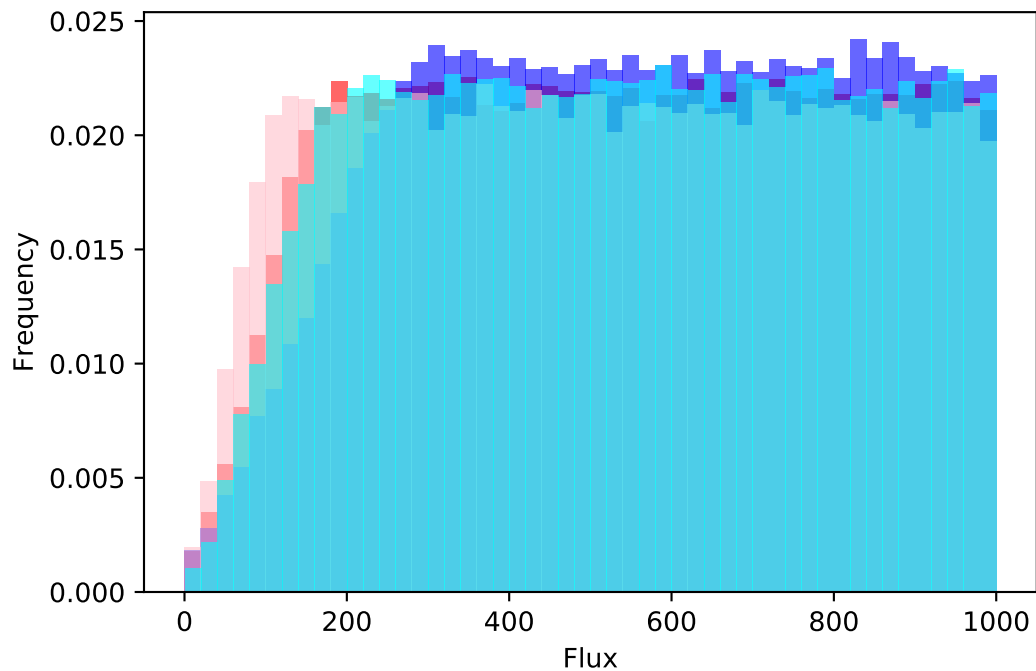
185 : Glu_c + H_c --> CO2_c + GABA_c
['AT2G02010', 'AT2G02000', 'AT3G17760', 'AT1G65960', '6*AT5G17330']
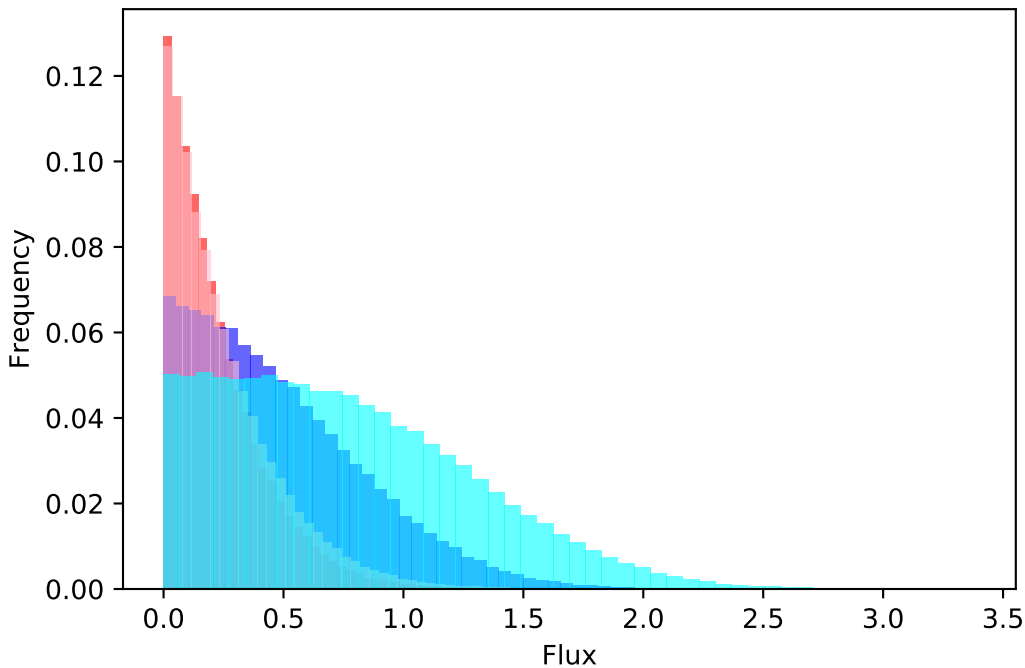
186 : GABA_m + Pyr_m <=> Ala_m + SCA_DASH_SeA_m
['2*AT3G22200']
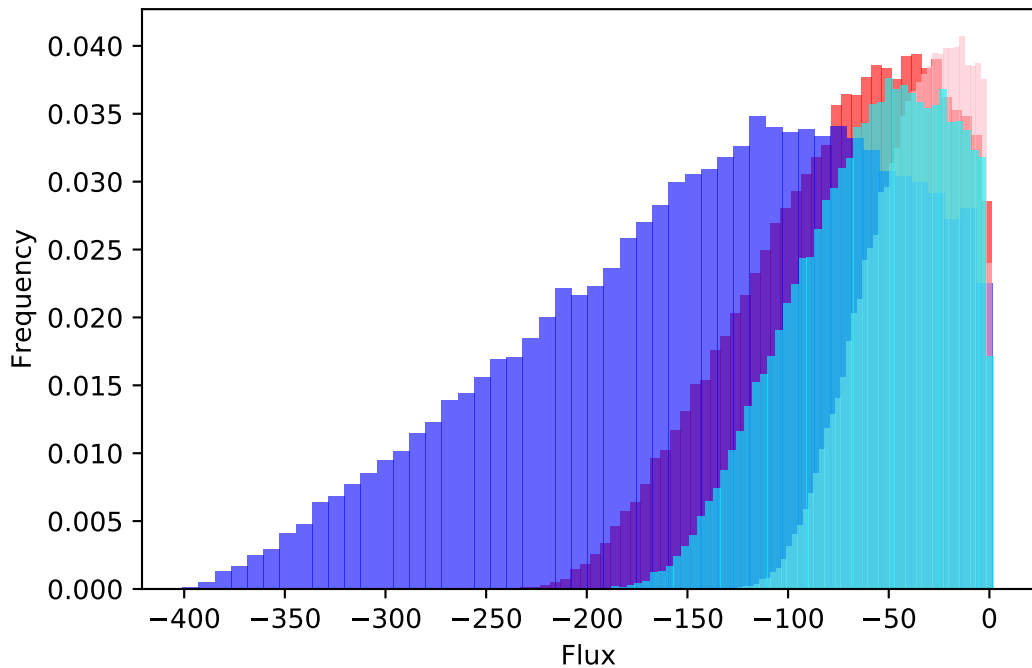
187 : GABA_m + KG_m --> Glu_m + SCA_DASH_SeA_m
['2*AT3G22200']
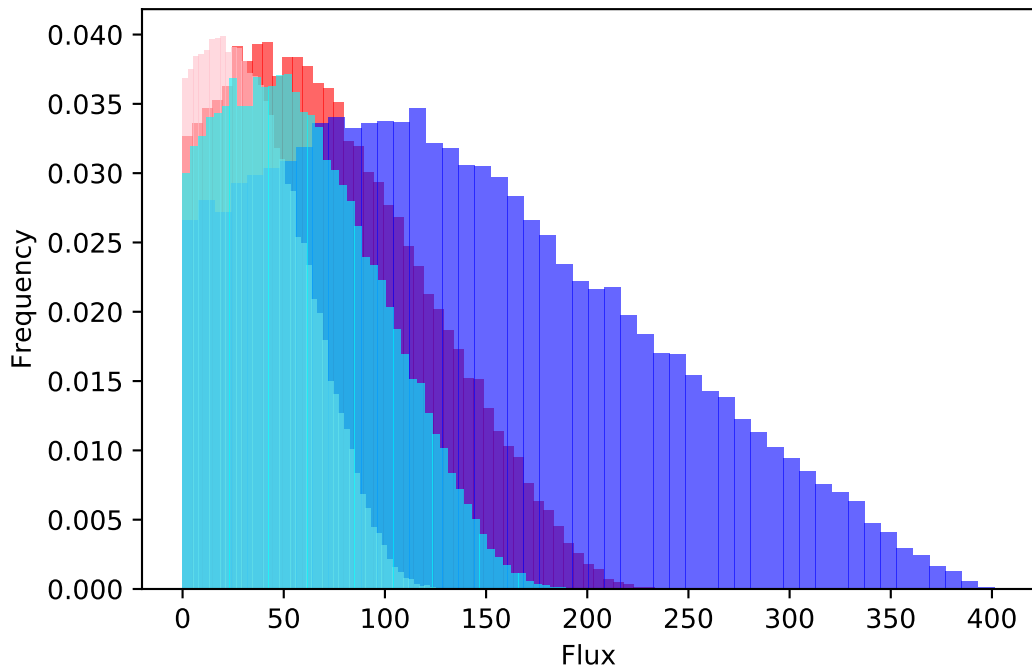
188 : H2O_m + NAD_m + SCA_DASH_SeA_m --> 2.0 H_m + NADH_m + SCA_m
['4*AT1G79440']
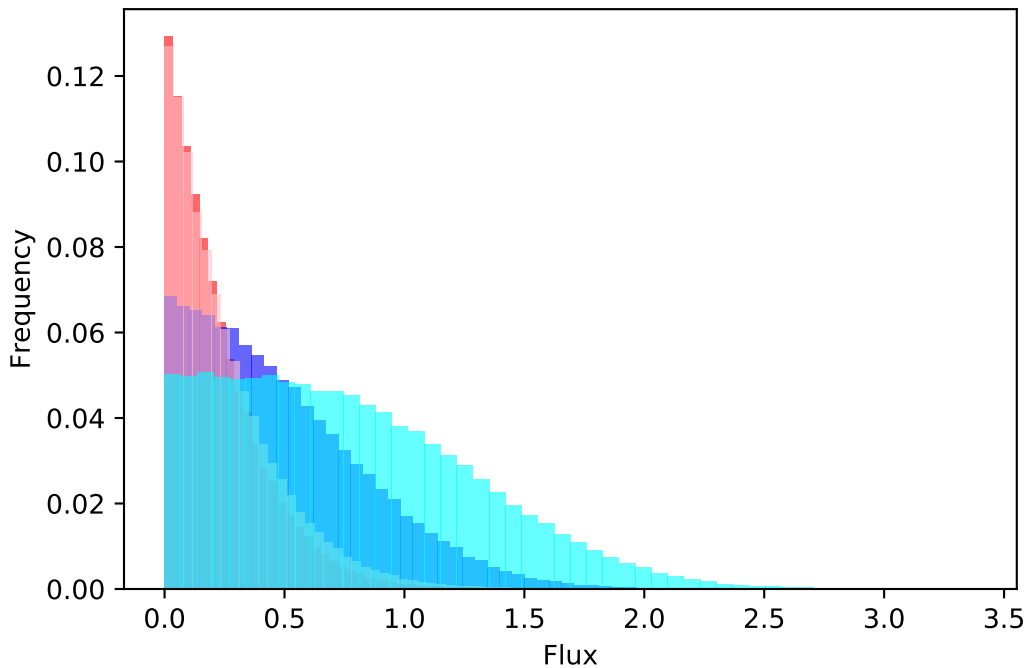
189 : ATP_c + Glu_c + NH4_c --> ADP_c + Gln_c + H_c + Pi_c
['AT1G66200', 'AT5G16570', 'AT3G17820', '8*AT5G37600']
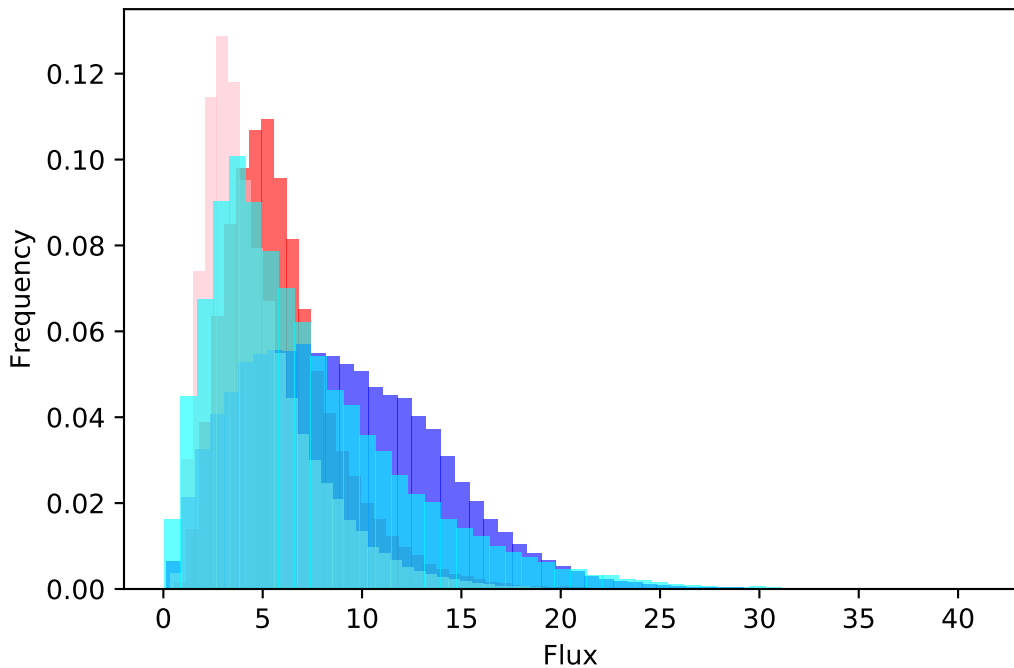
190 : ATP_h + Glu_h + NH4_h --> ADP_h + Gln_h + H_h + Pi_h
['AT5G35630', '8*AT3G17820', 'AT1G48470']
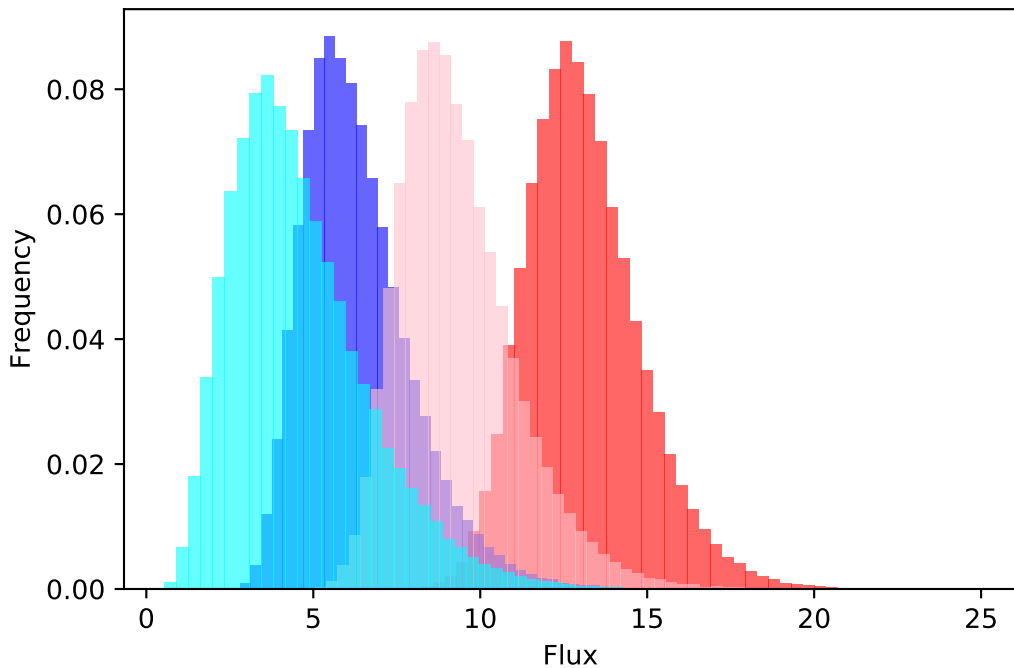
191 : ATP_m + Glu_m + NH4_m --> ADP_m + Gln_m + H_m + Pi_m
['8*AT5G35630']
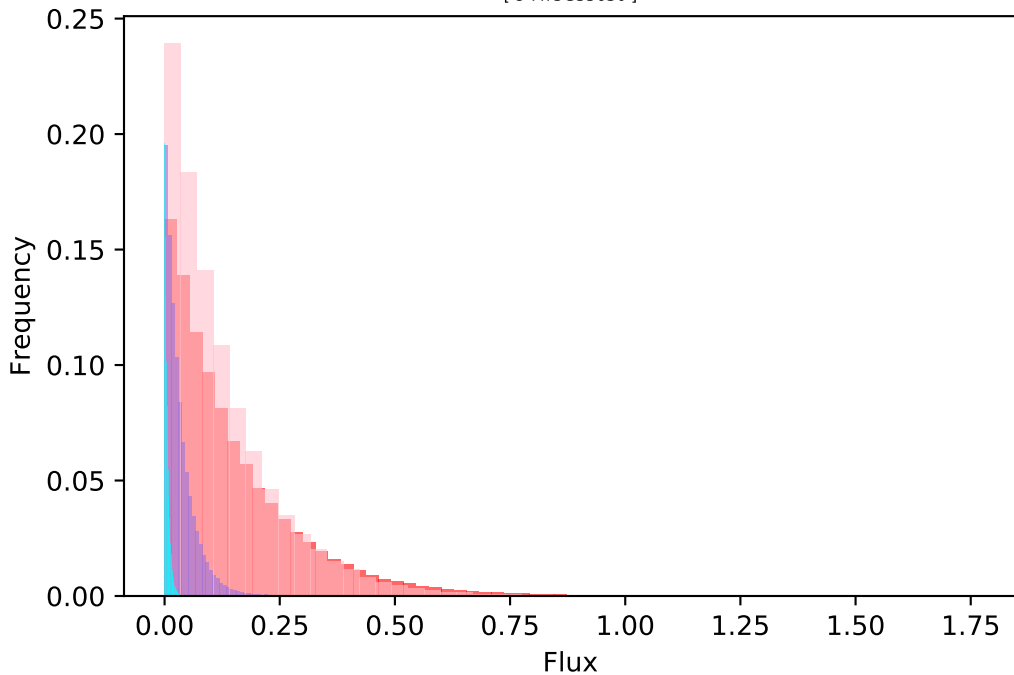
192 : Thr_c --> ACD_c + Gly_c
['AT1G08630']
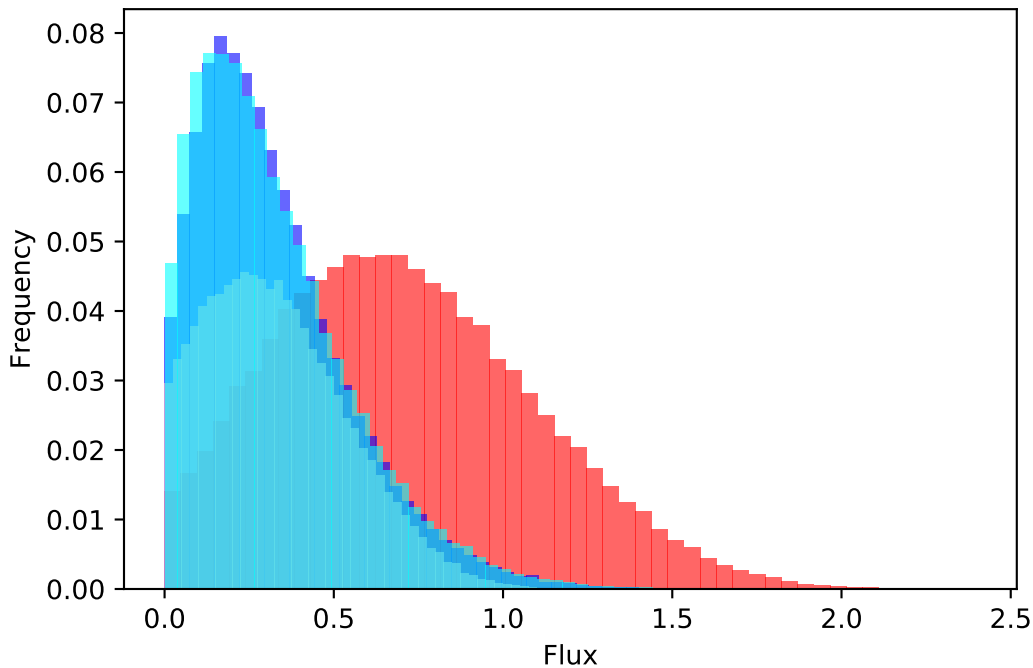
193 : ACD_c + H2O_c + NAD_c --> AC_c + H_c + NADH_c
['AT3G66658', 'AT3G24503', 'AT1G54100', 'AT1G44170', 'AT4G36250']
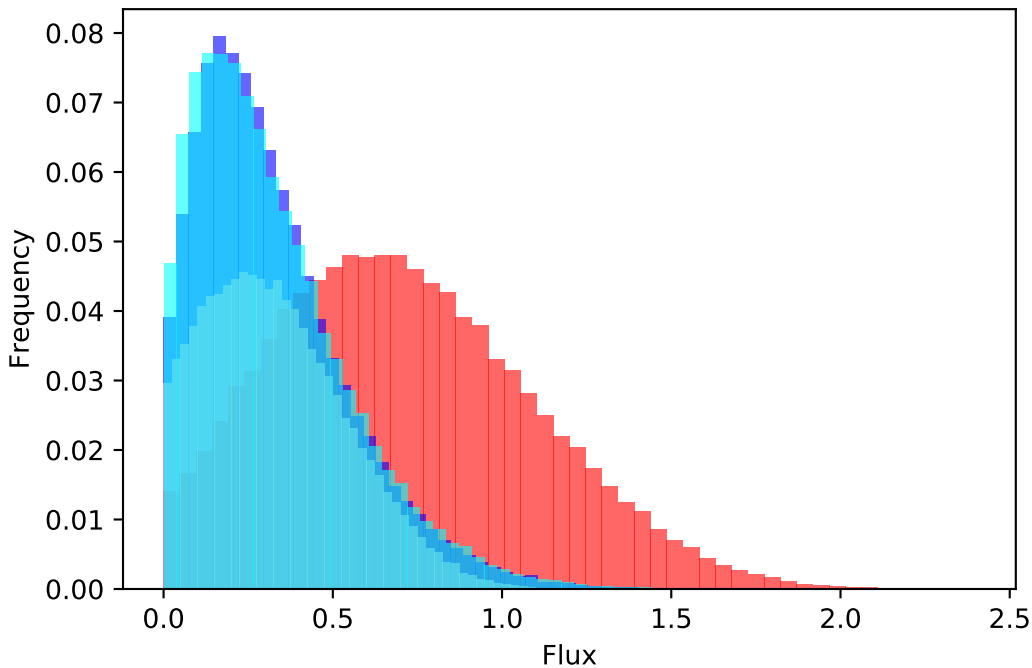
194 : GCA_h + O2_h --> GLX_h + H2O2_h
['AT3G14420', 'AT3G14415']
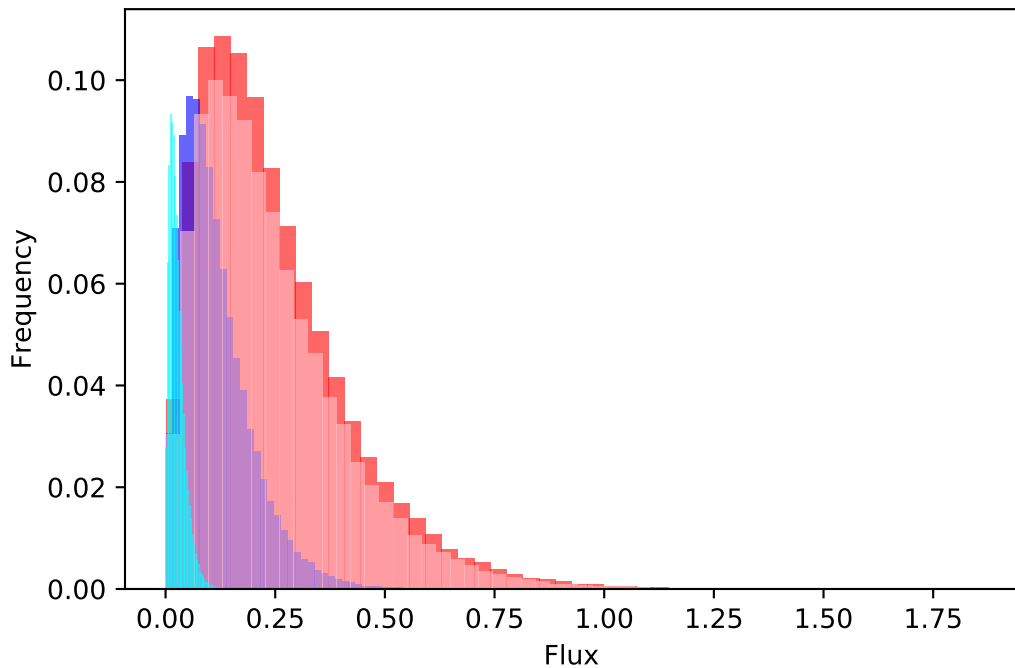
195 : 2.0 H2O2_h --> 2.0 H2O_h + O2_h
['4*AT1G20620', 'AT1G20630', 'AT4G35090']
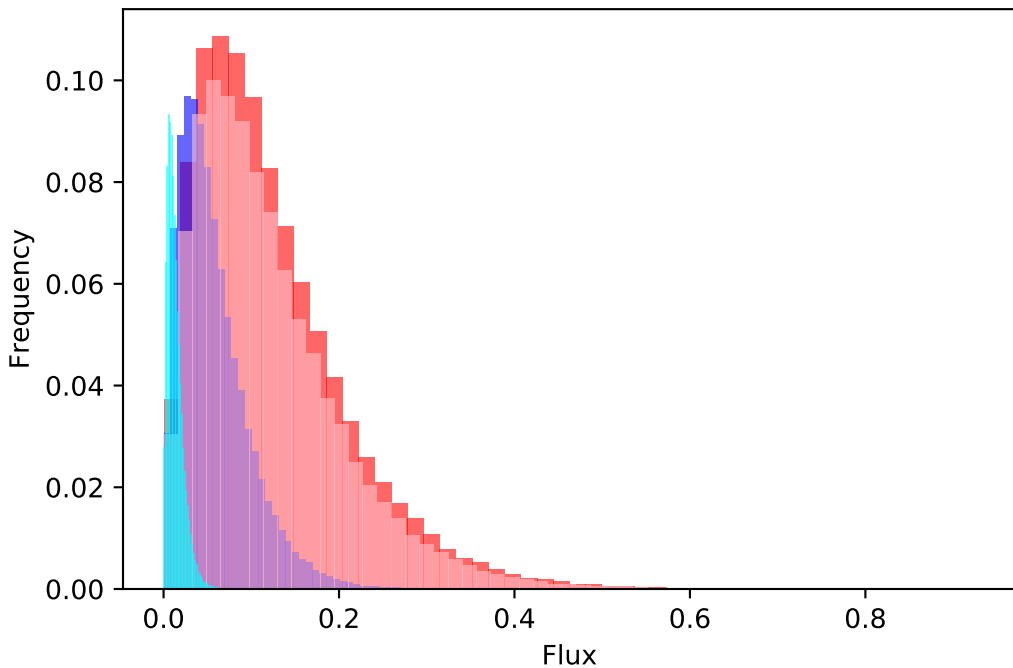
196 : GLX_h + Ser_h --> Gly_h + HPR_h
['2*AT2G13360']
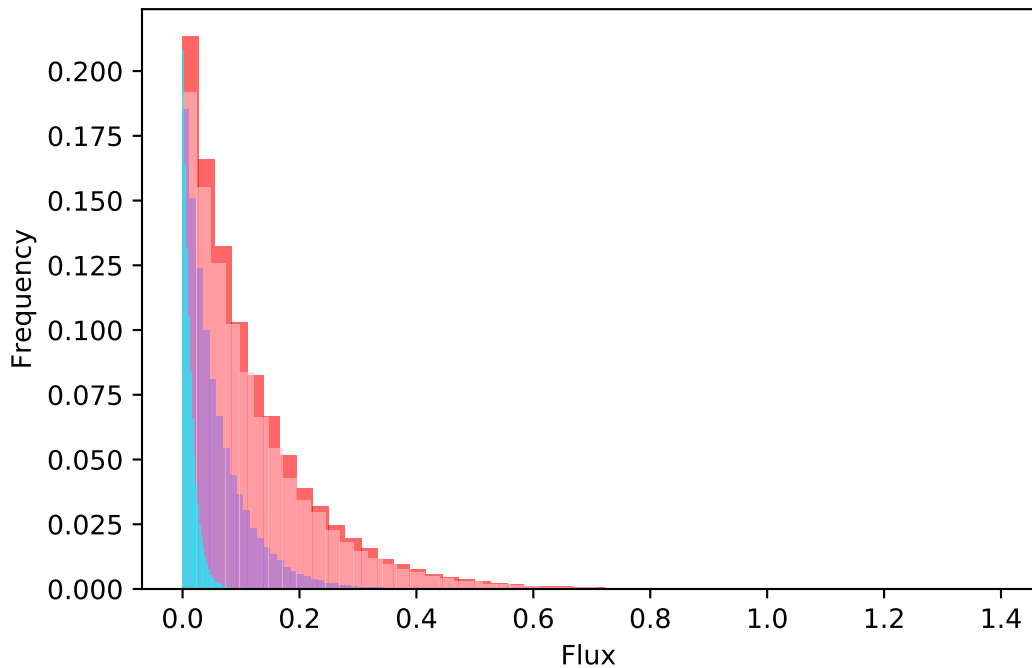
197 : HPR_h + H_h + NADH_h --> GCEA_h + NAD_h
['AT1G68010']
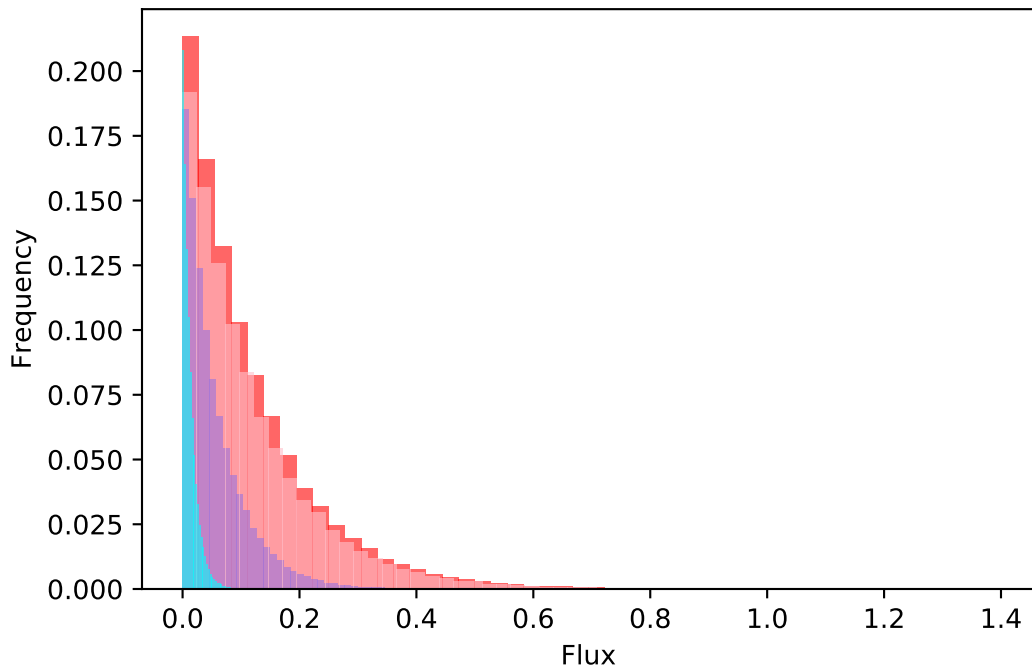
198 : GLX_h + Glu_h --> Gly_h + KG_h
['AT1G70580', 'AT1G23310']
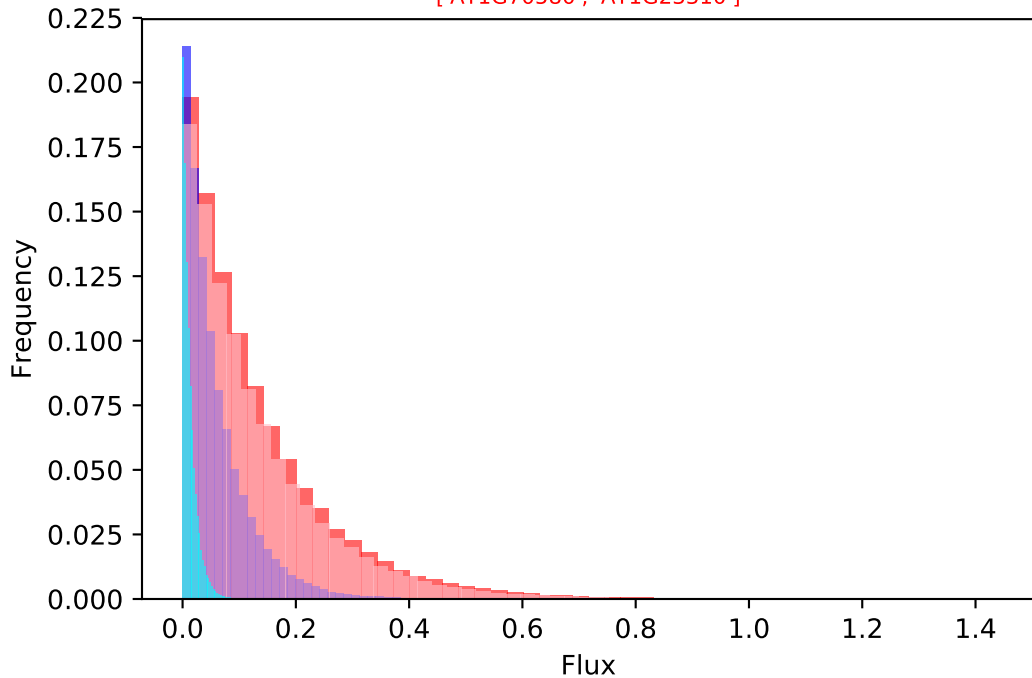
199 : ATP_h + PRPP_h --> H_h + PPi_h + PR_DASH_ATP_h
['AT1G09795', 'AT1G58080']
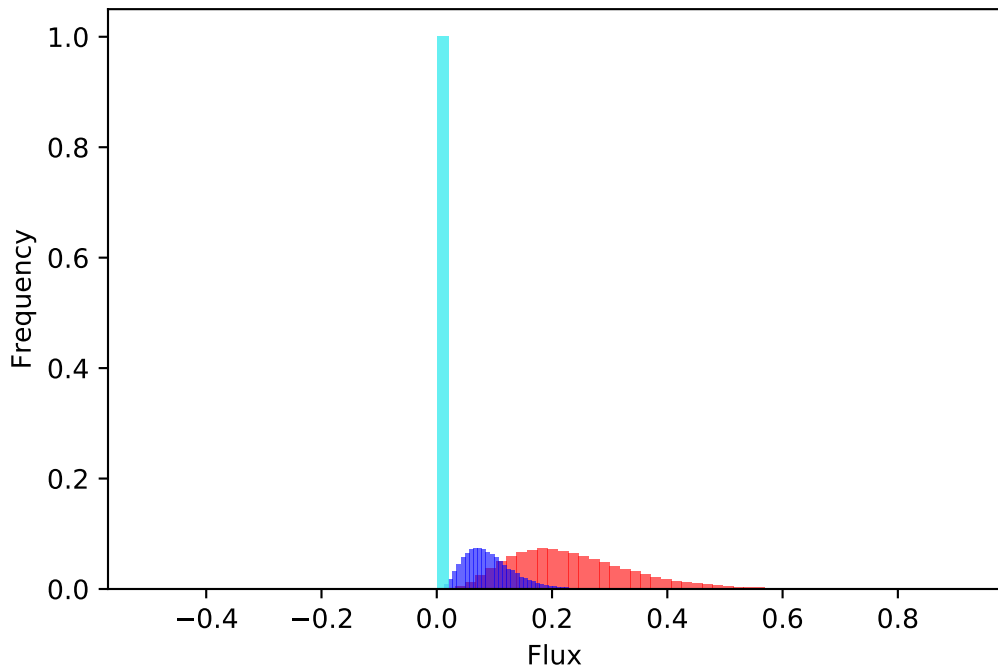
200 : H2O_h + PR_DASH_ATP_h --> 2.0 H_h + PPi_h + PR_DASH_AMP_h
['AT1G31860']
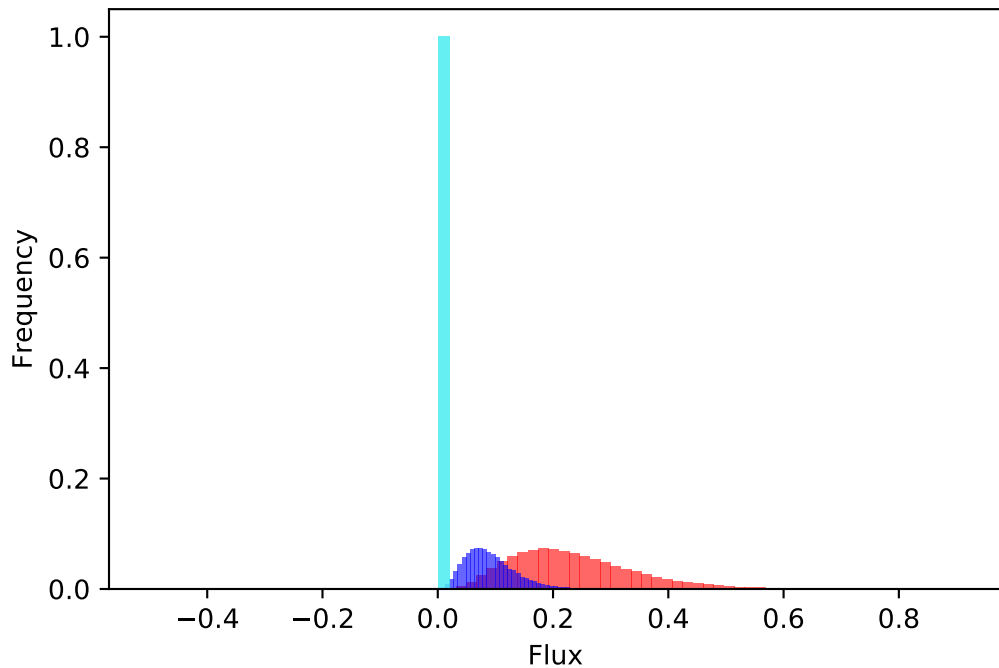
201 : H2O_h + PR_DASH_AMP_h --> P_DASH_AICAR_DASH_P_h
['AT1G31860']
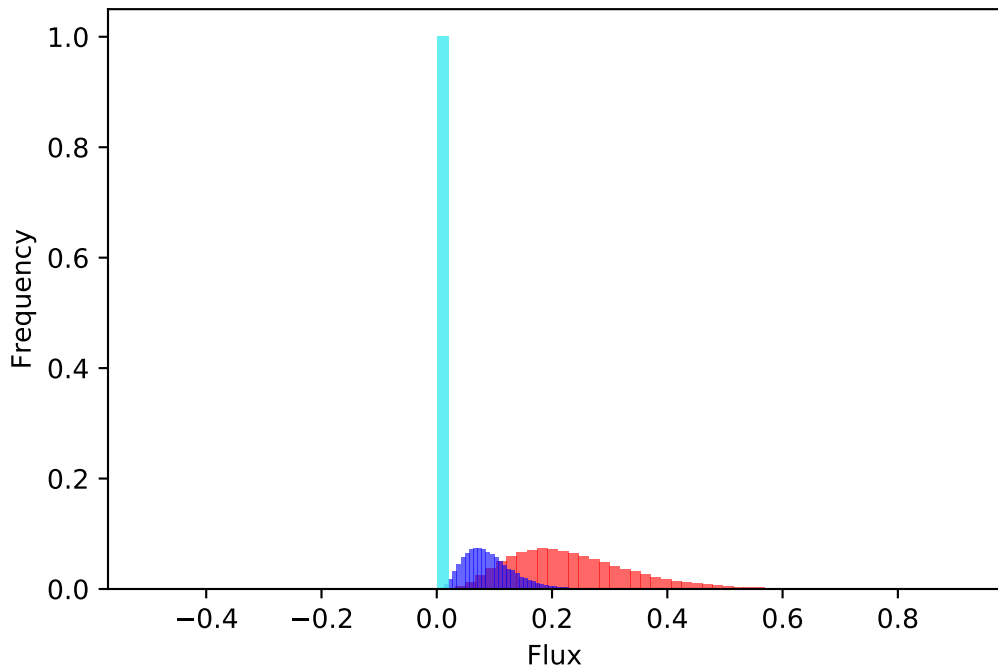
202 : P_DASH_AICAR_DASH_P_h --> Pu_DASH_AICAR_DASH_P_h
['AT2G36230']
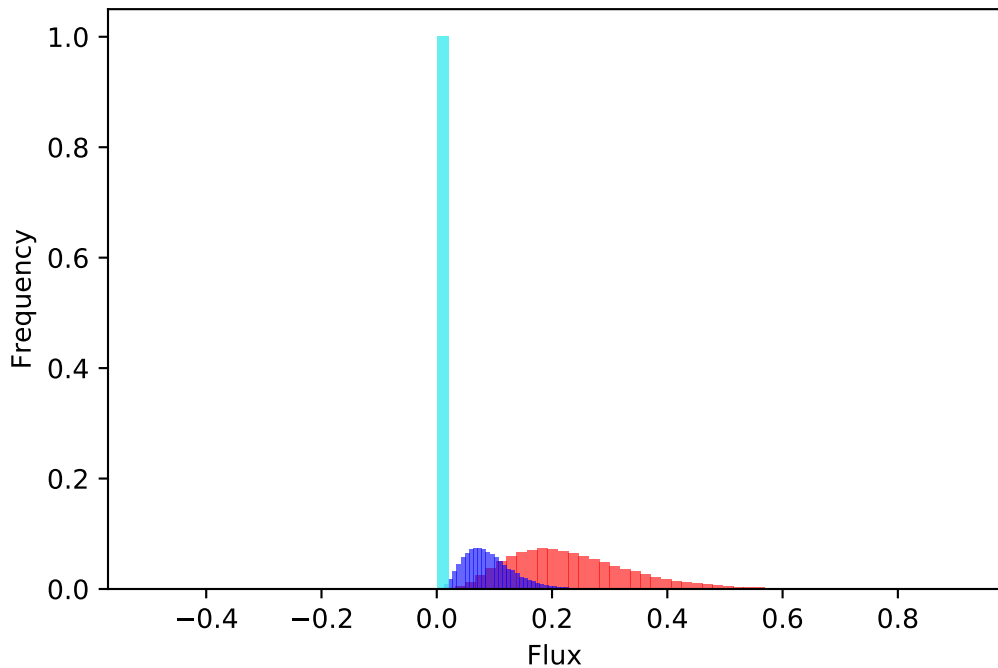
203 : Gln_h + Pu_DASH_AICAR_DASH_P_h --> AICAR_h + EIGP_h + Glu_h
['AT4G26900']
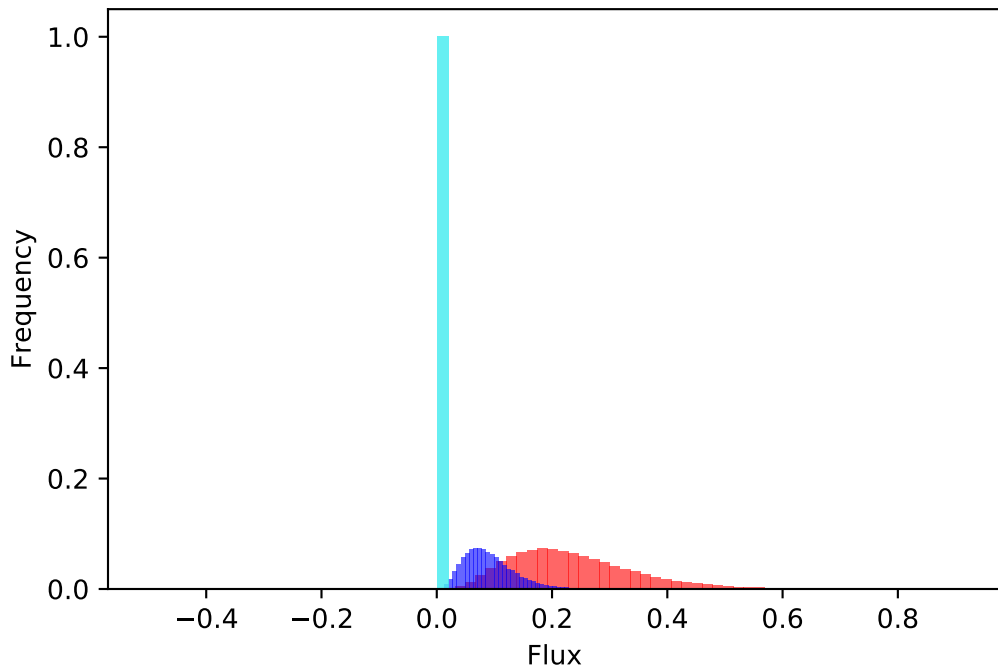
204 : EIGP_h --> H2O_h + IA_DASH_P_h
['AT4G14910', 'AT3G22425']
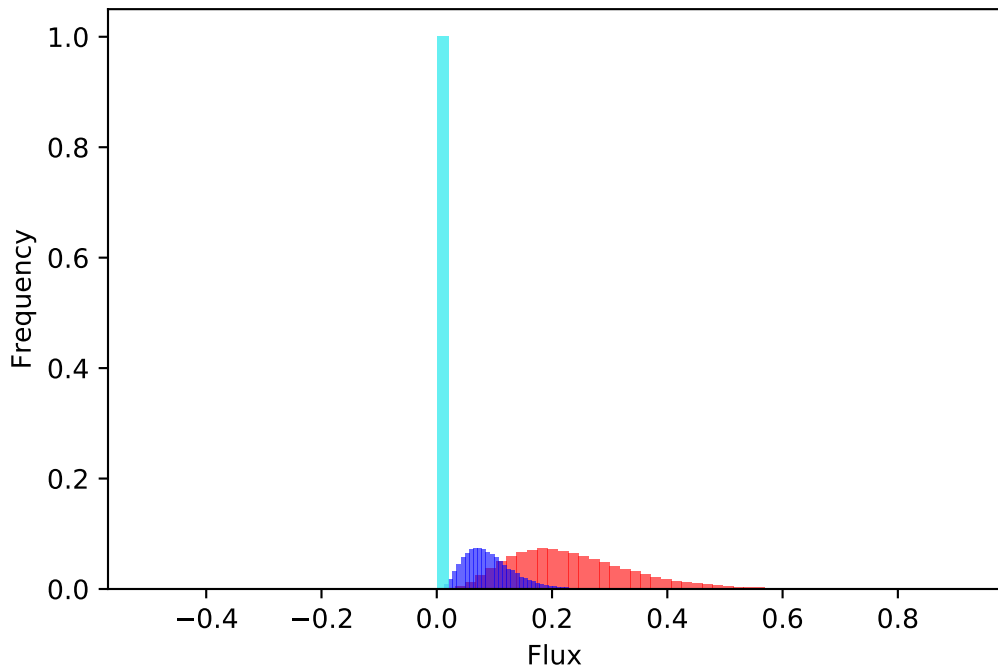
205 : Glu_h + IA_DASH_P_h --> Hisol_DASH_P_h + KG_h
['AT5G10330', 'AT1G71920']
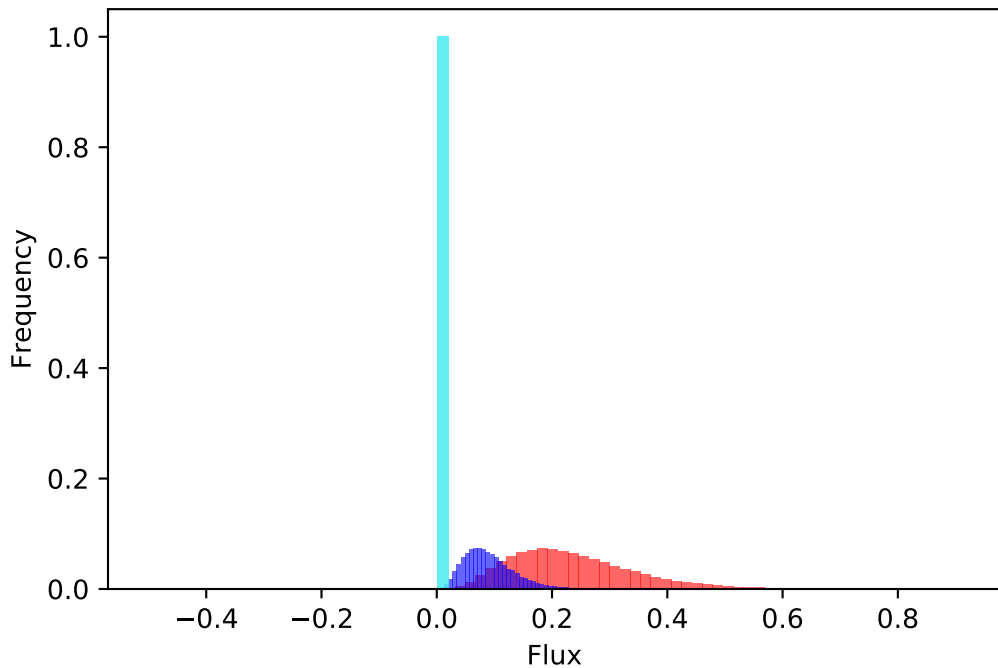
206 : H2O_h + Hisol_DASH_P_h --> Hisol_h + Pi_h
['AT4G39120']
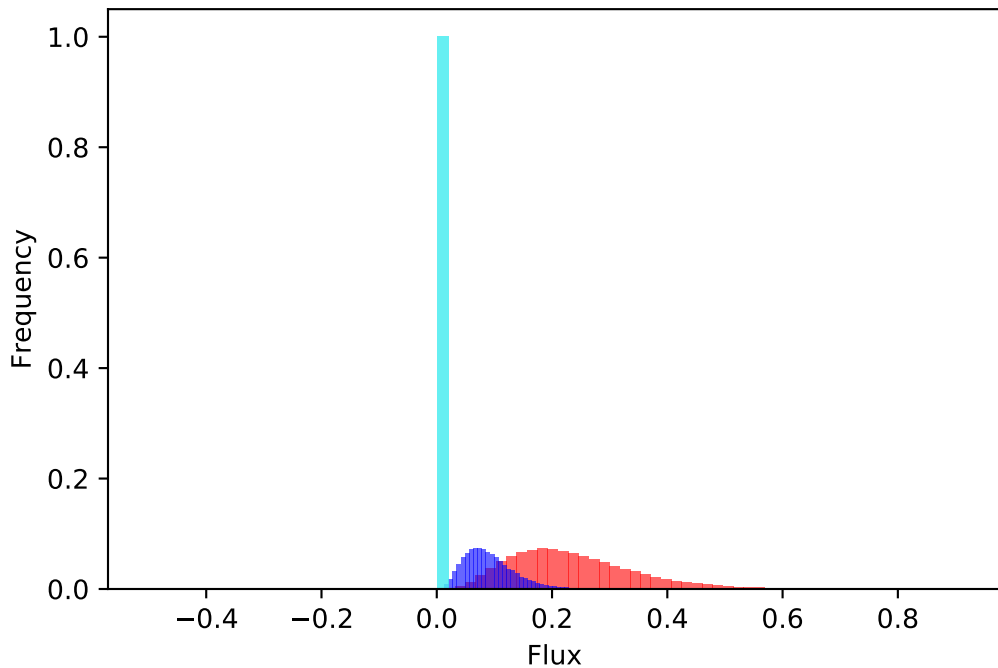
207 : Hisol_h + NAD_h --> 2.0 H_h + Hisal_h + NADH_h
['AT5G63890']
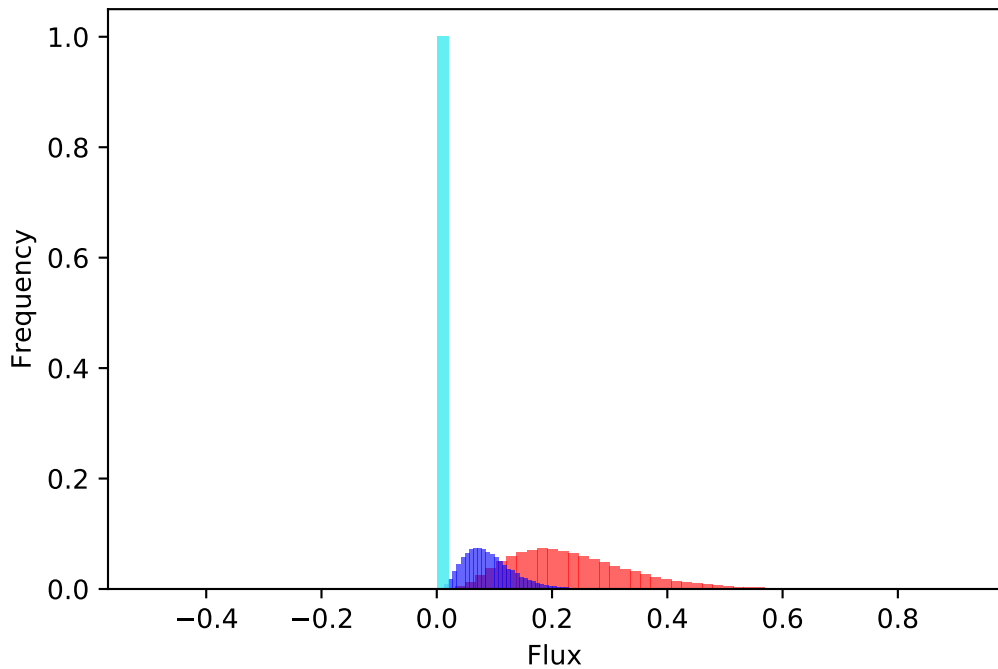
208 : H2O_h + Hisal_h + NAD_h --> H_h + His_h + NADH_h
['AT5G63890']
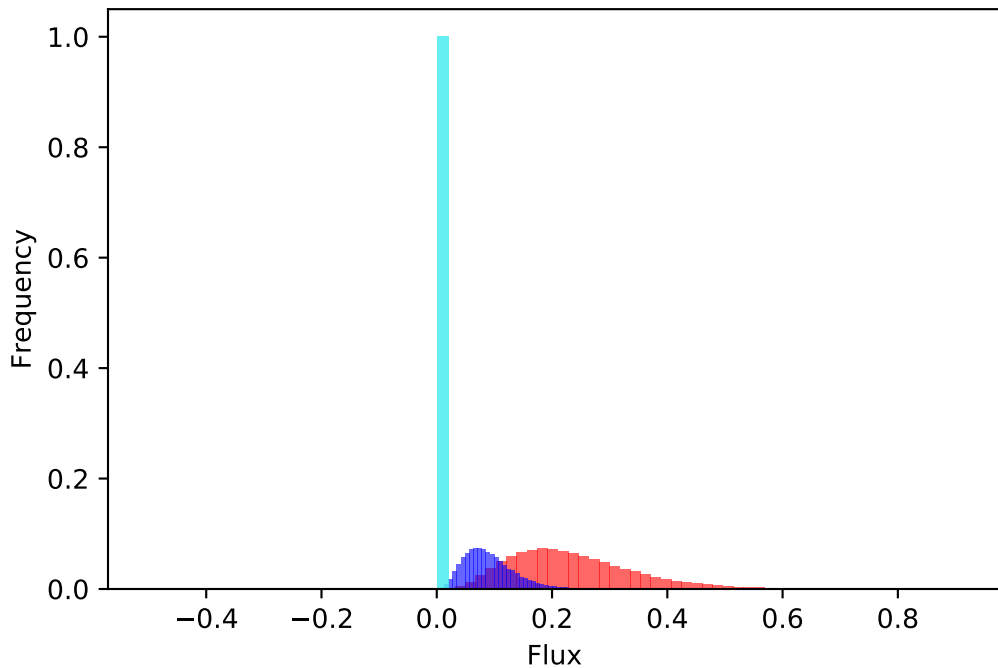
209 : Thr_h --> NH4_h + OB_h
['4*AT3G10050']
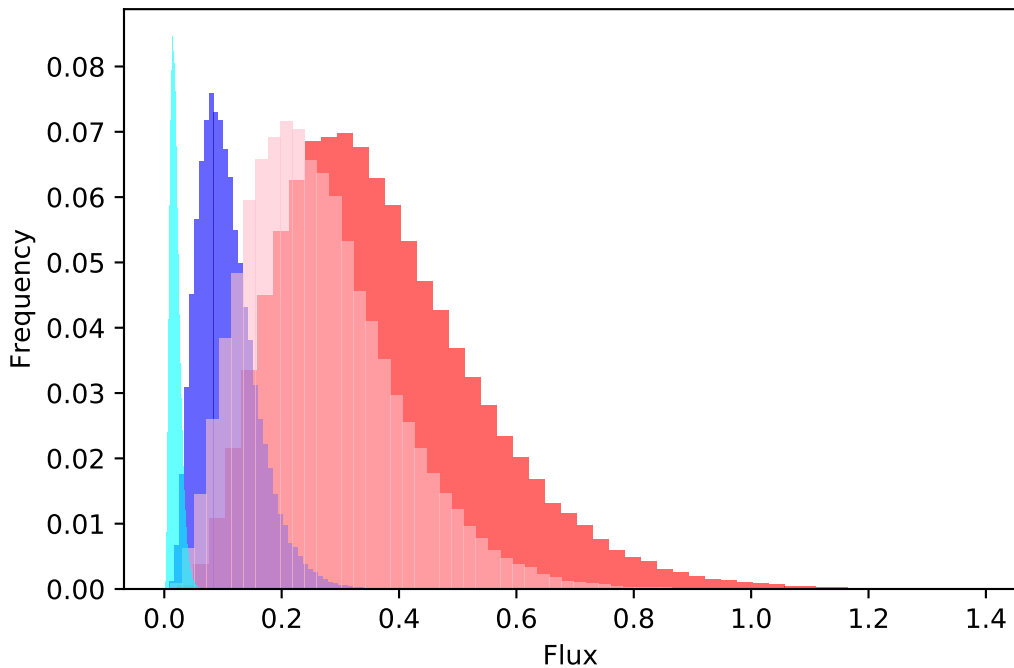
210 : H_h + Pyr_h + ThPP_h --> CO2_h + H_DASH_Eth_DASH_ThPP_h
['2*AT3G48560']
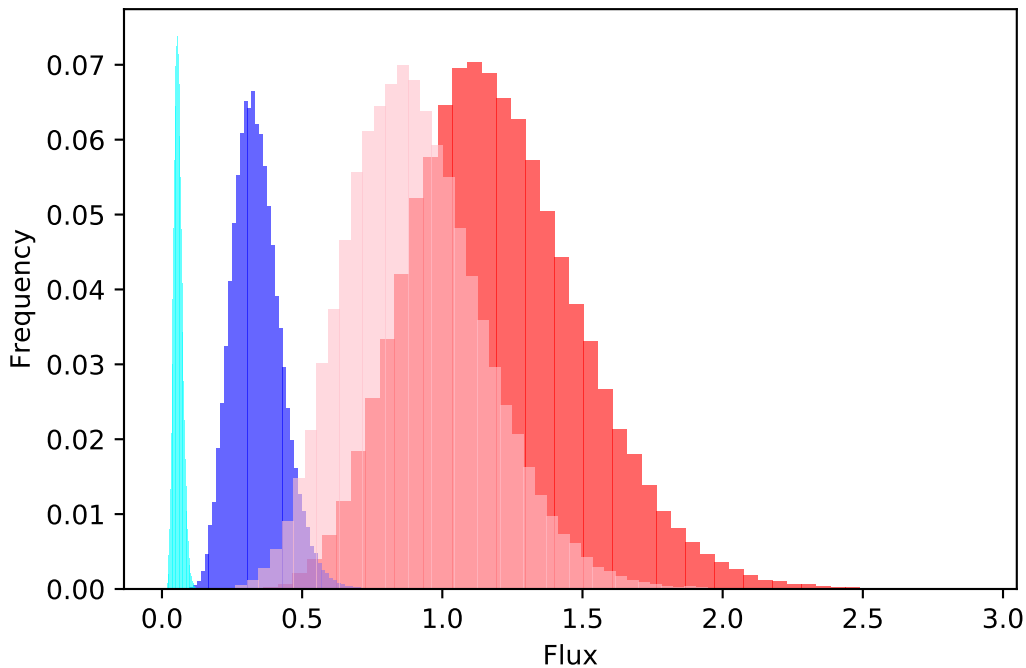
211 : H_DASH_Eth_DASH_ThPP_h + OB_h --> AHB_h + ThPP_h
['2*AT3G48560']
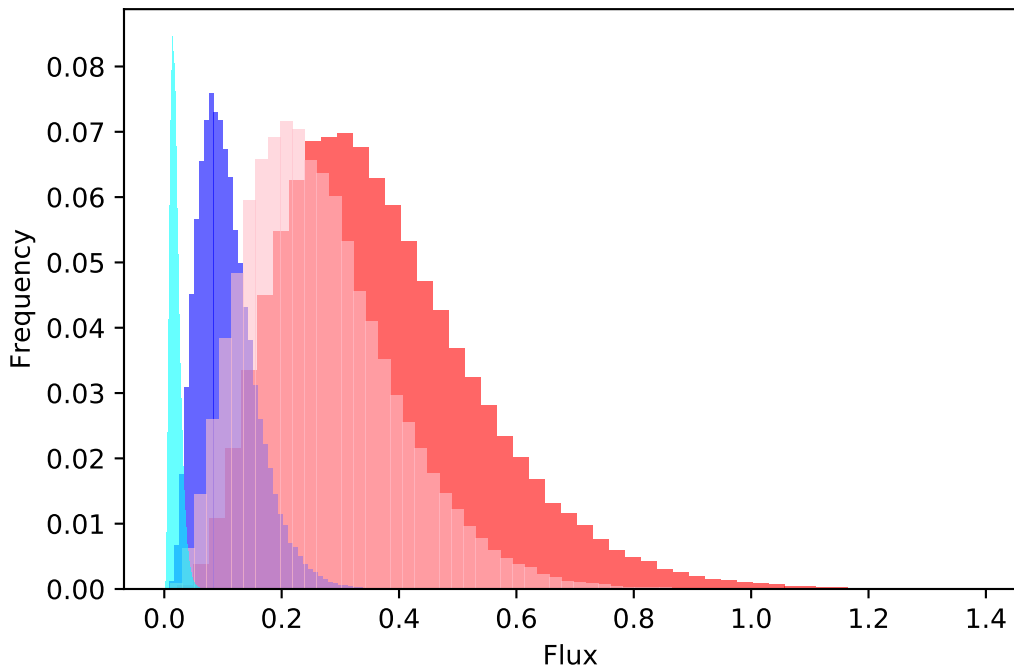
212 : AHB_h <=> HMOP_h
['AT3G58610']
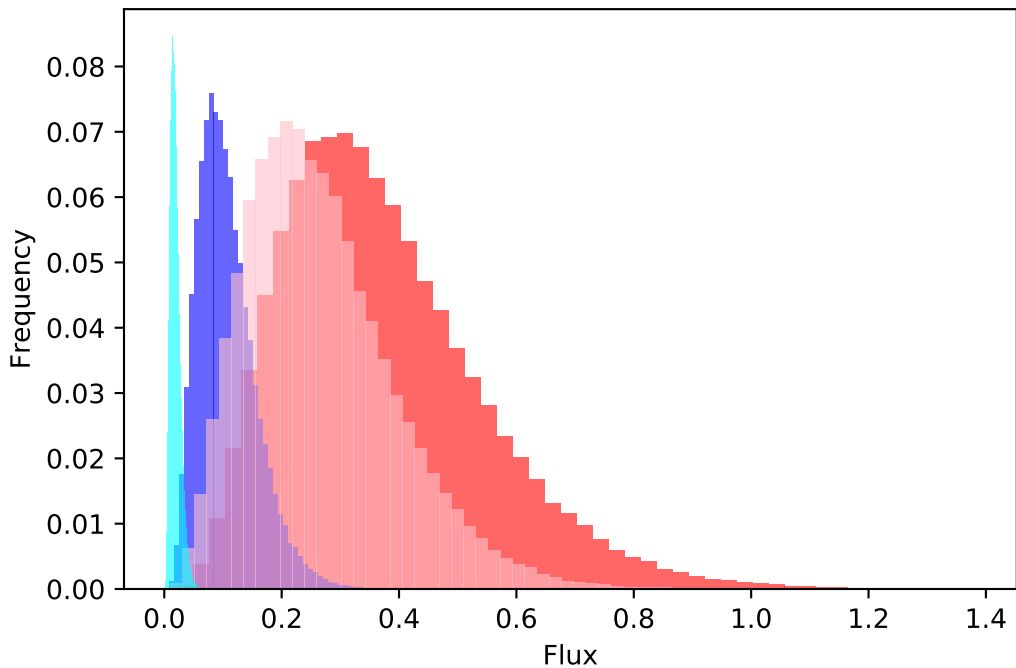
213 : HMOP_h + H_h + NADPH_h --> DHMP_h + NADP_h
['AT3G58610']
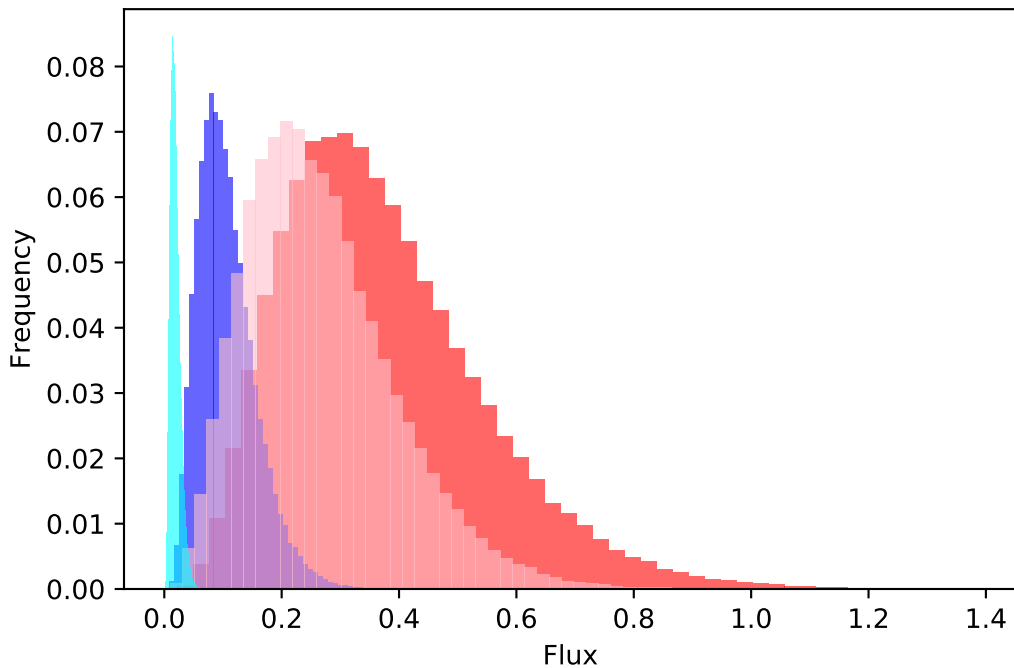
214 : DHMP_h --> H2O_h + MOP_h
['AT3G23940']
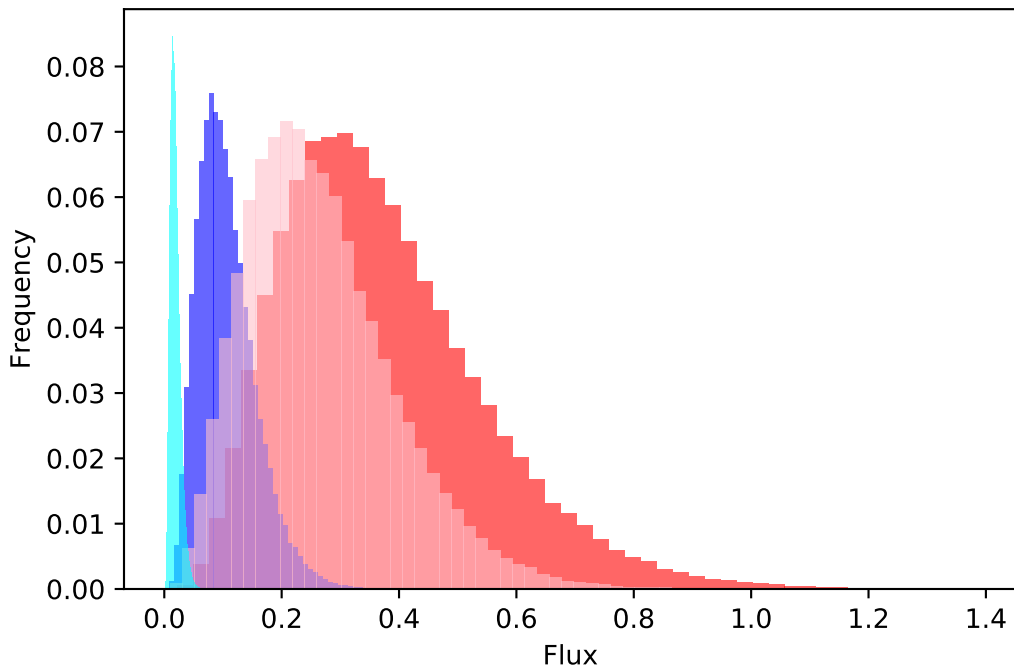
215 : Glu_h + MOP_h <=> Ile_h + KG_h
['AT1G10070', 'AT5G65780', 'AT3G49680']
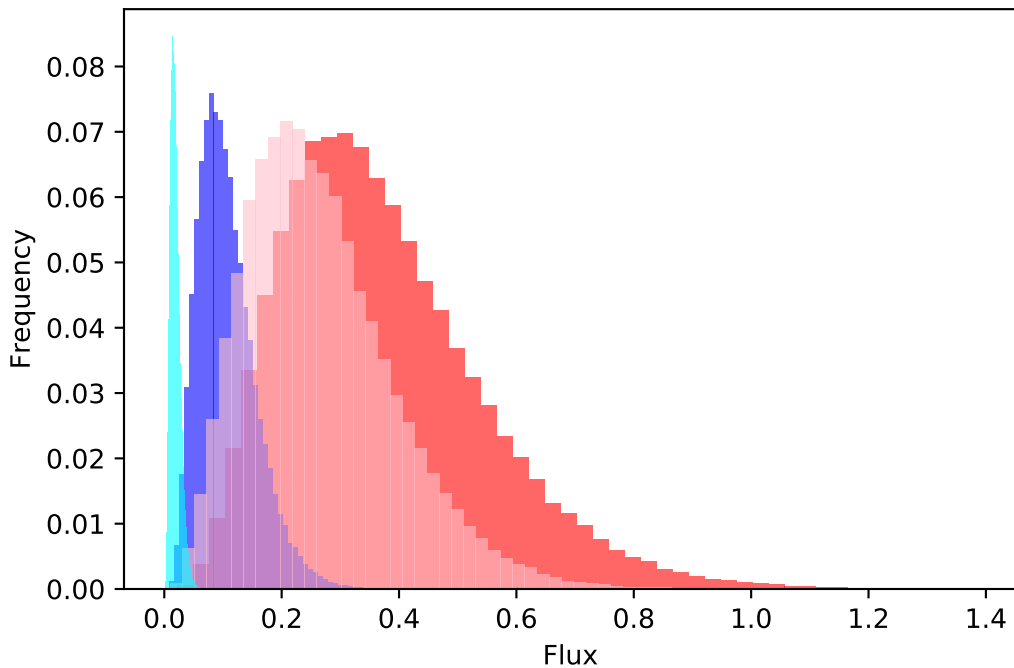
216 : H_DASH_Eth_DASH_ThPP_h + Pyr_h --> AL_h + ThPP_h
['2*AT3G48560']
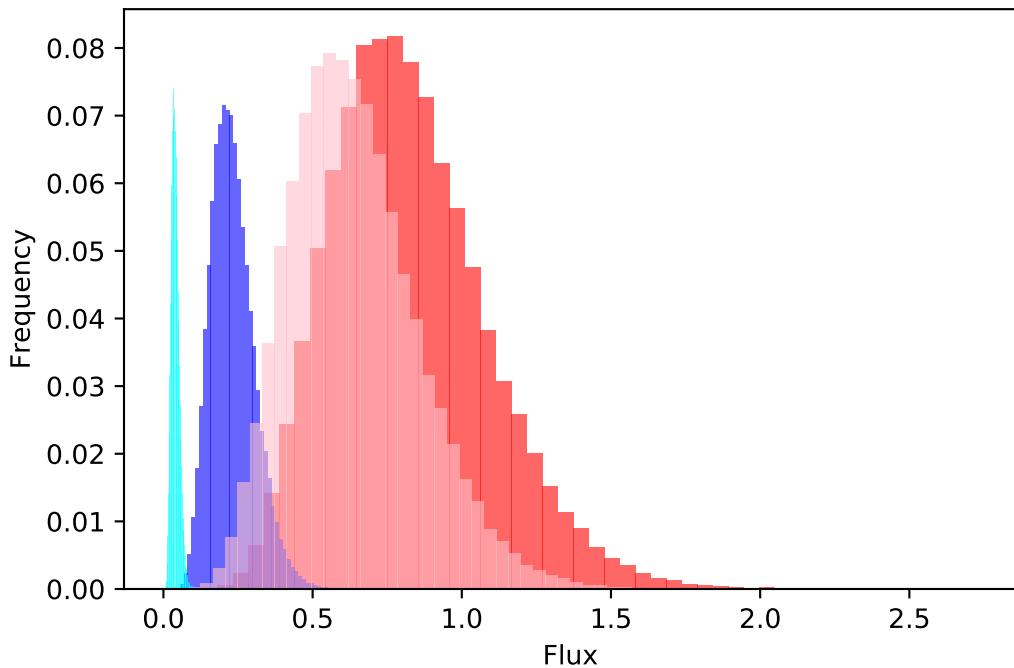
217 : AL_h <=> HMOB_h
['AT3G58610']
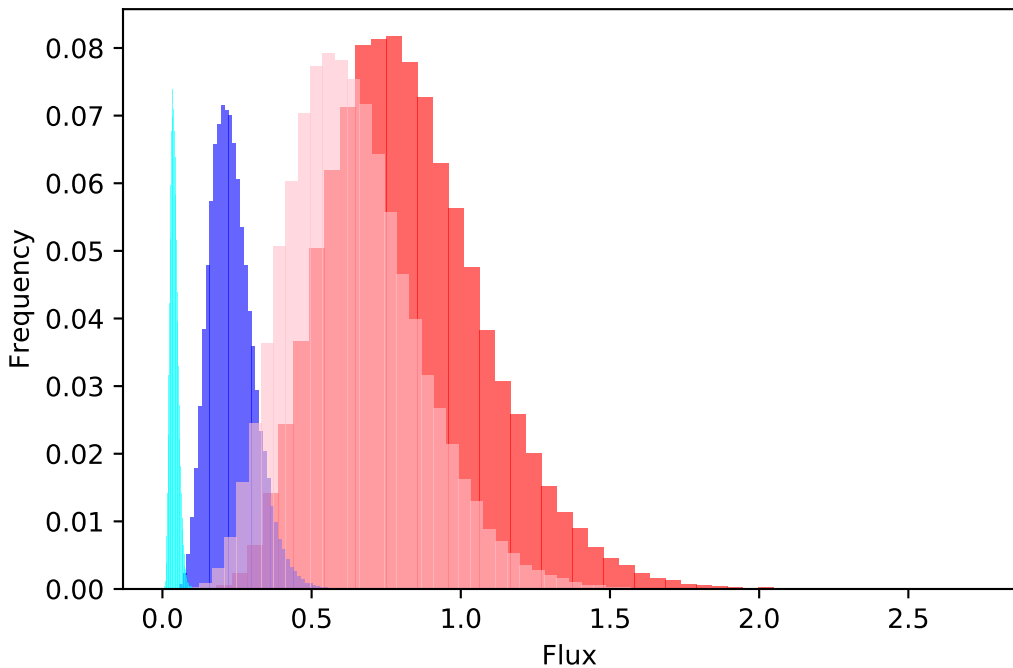
218 : HMOB_h + H_h + NADPH_h --> DHMB_h + NADP_h
['AT3G58610']
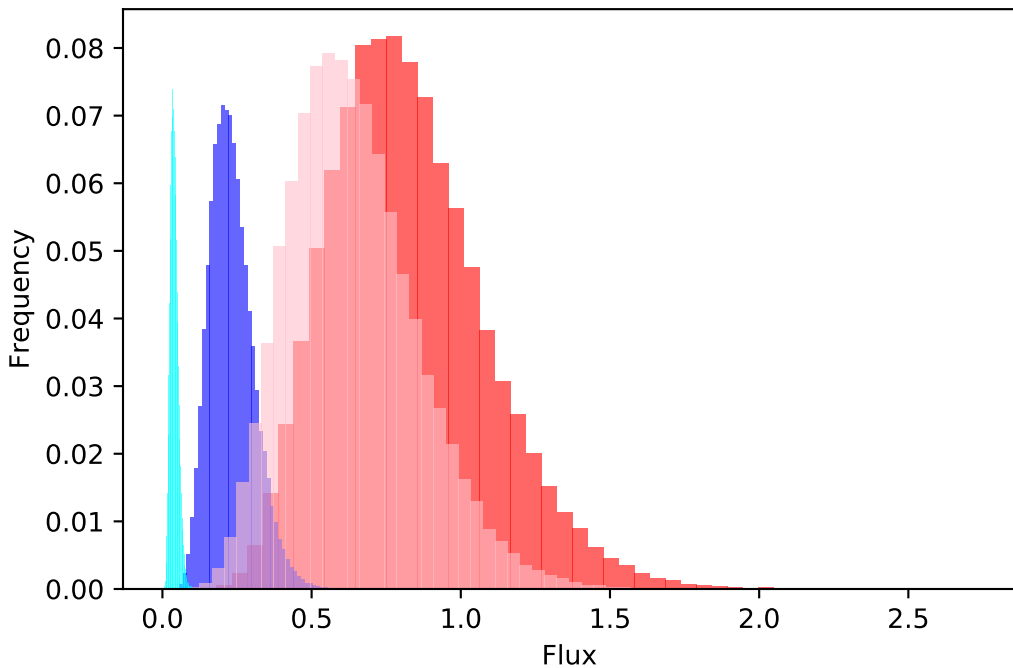
219 : DHMB_h --> H2O_h + MOB_h
['AT3G23940']
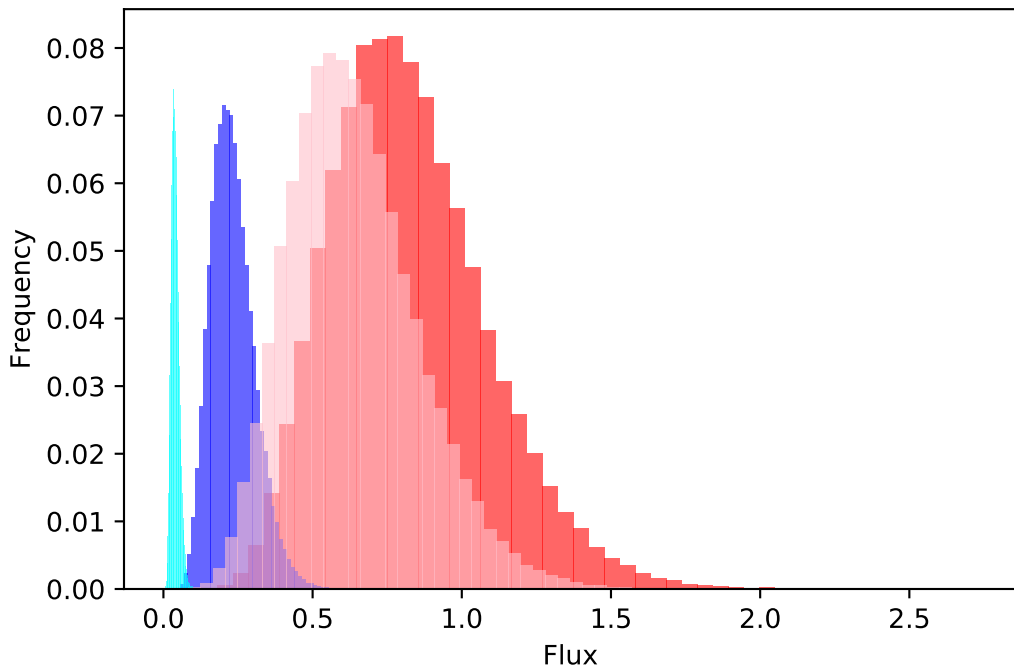
220 : A_DASH_CoA_h + H2O_h + MOB_h --> 2IPM_h + CoA_h + H_h
['4*AT1G74040', '2*AT1G18500']
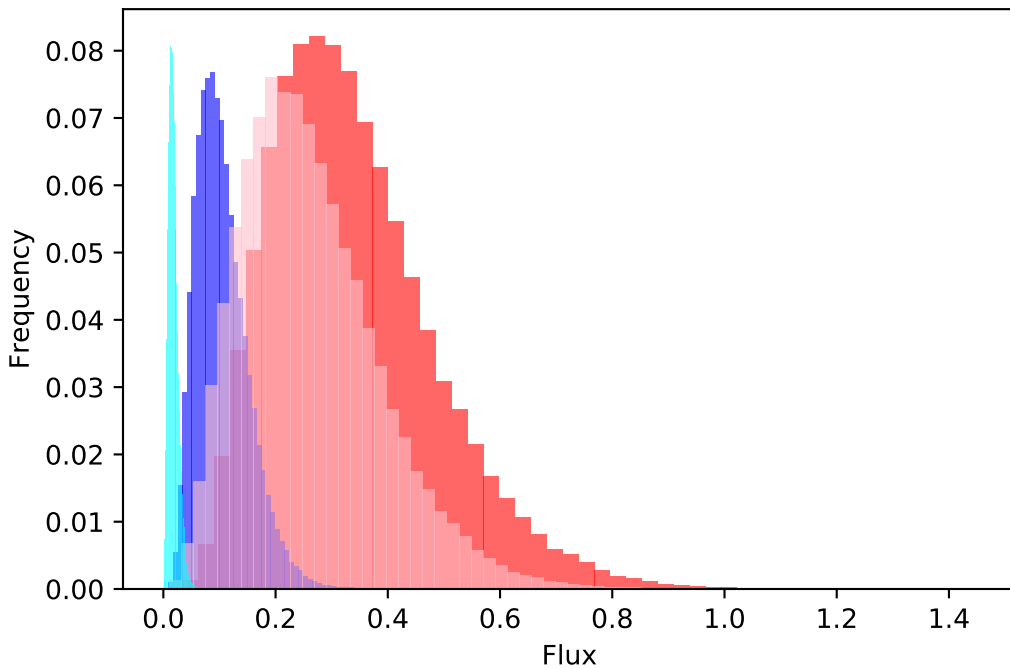
221 : 2IPM_h --> H2O_h + IPM_h
['AT3G58990', 'AT2G43090', 'AT4G13430', 'AT2G43100']
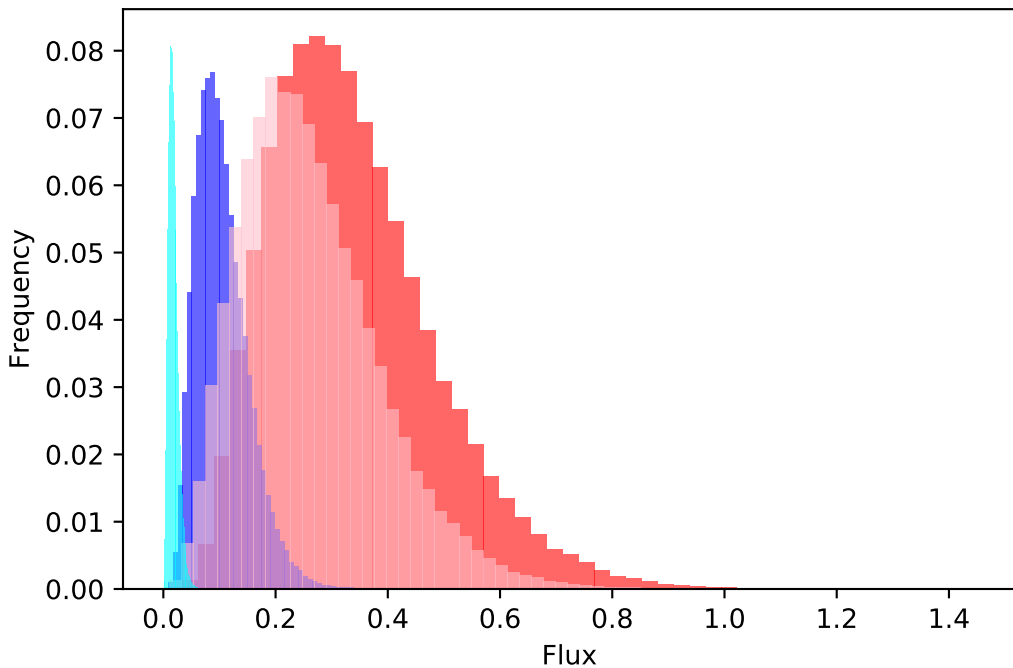
222 : H2O_h + IPM_h --> 3IPM_h
['AT3G58990', 'AT4G13430', 'AT2G43090', 'AT2G43100']
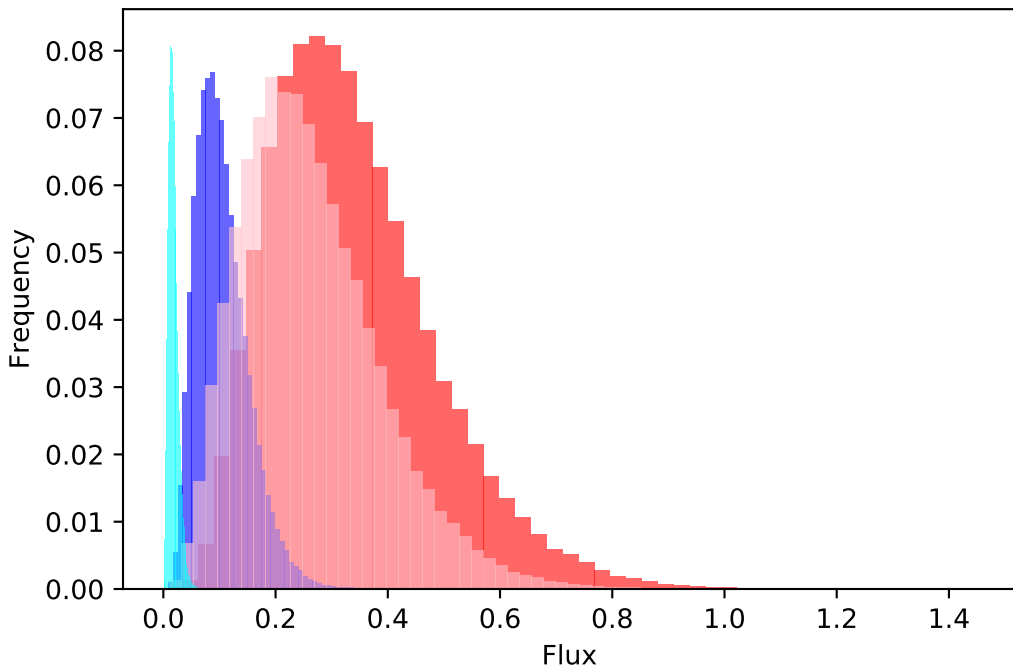
223 : 3IPM_h + NAD_h --> H_h + IPO_h + NADH_h
['AT1G31180', 'AT5G14200', 'AT1G80560']
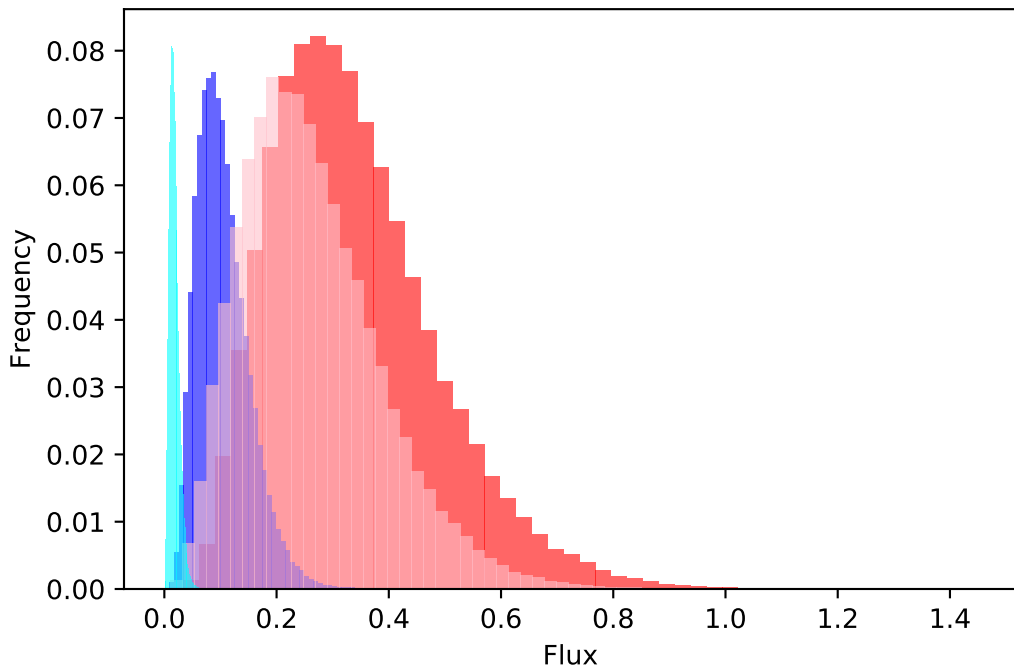
224 : H_h + IPO_h --> 4MOP_h + CO2_h
['-']
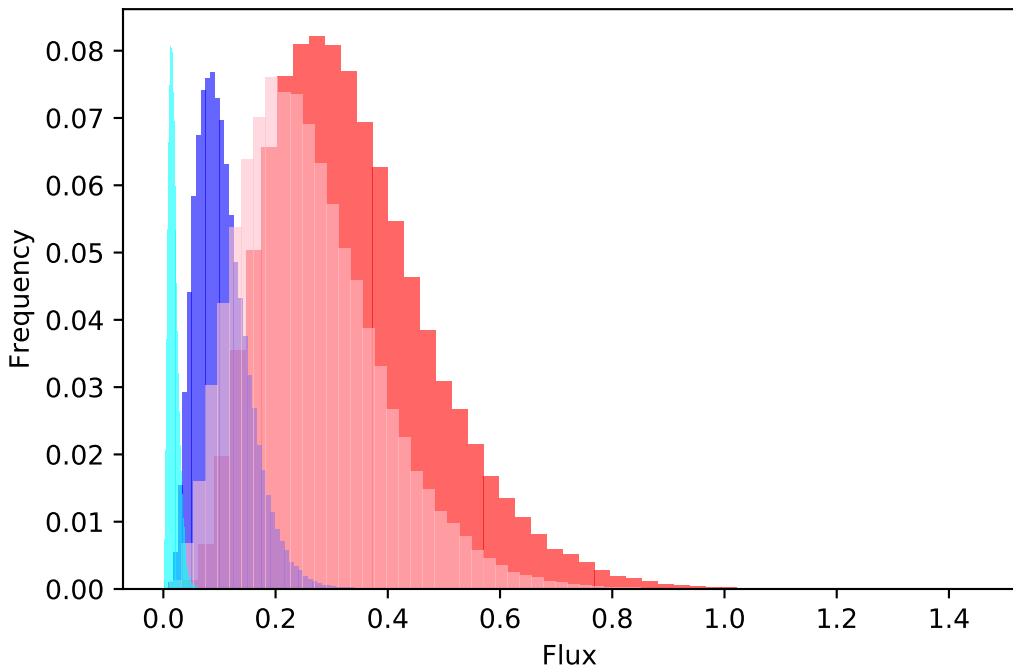
225 : 4MOP_h + Glu_h <=> KG_h + Leu_h
['AT1G10070', 'AT5G65780', 'AT3G49680']
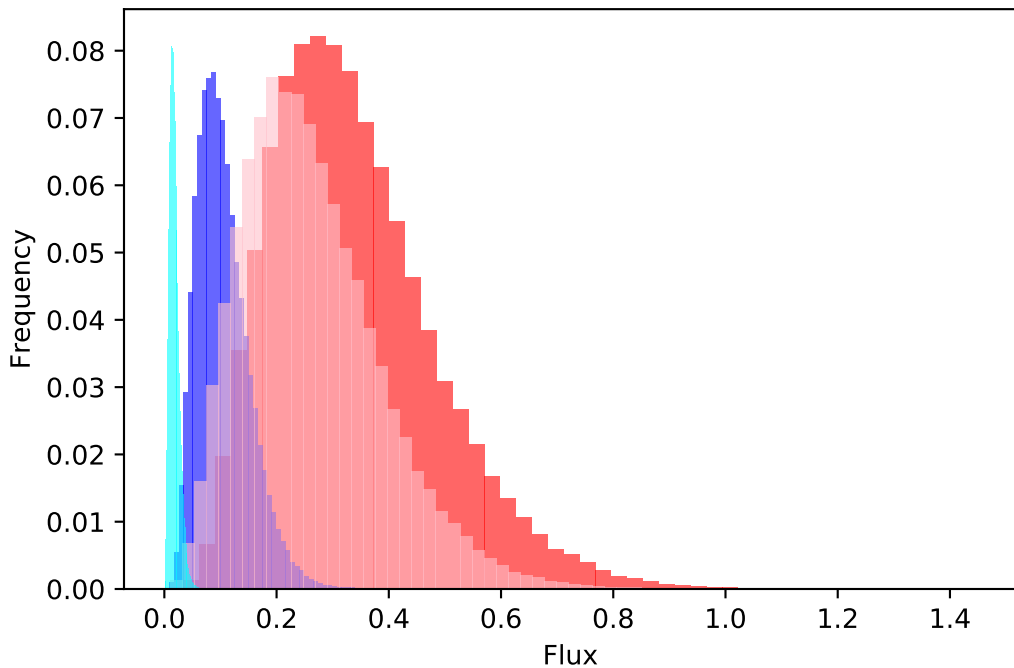
226 : ATP_h + Asp_h --> ADP_h + AspP_h
['AT5G14060', 'AT3G02020', 'AT5G13280', '4*AT4G19710', 'AT1G31230']
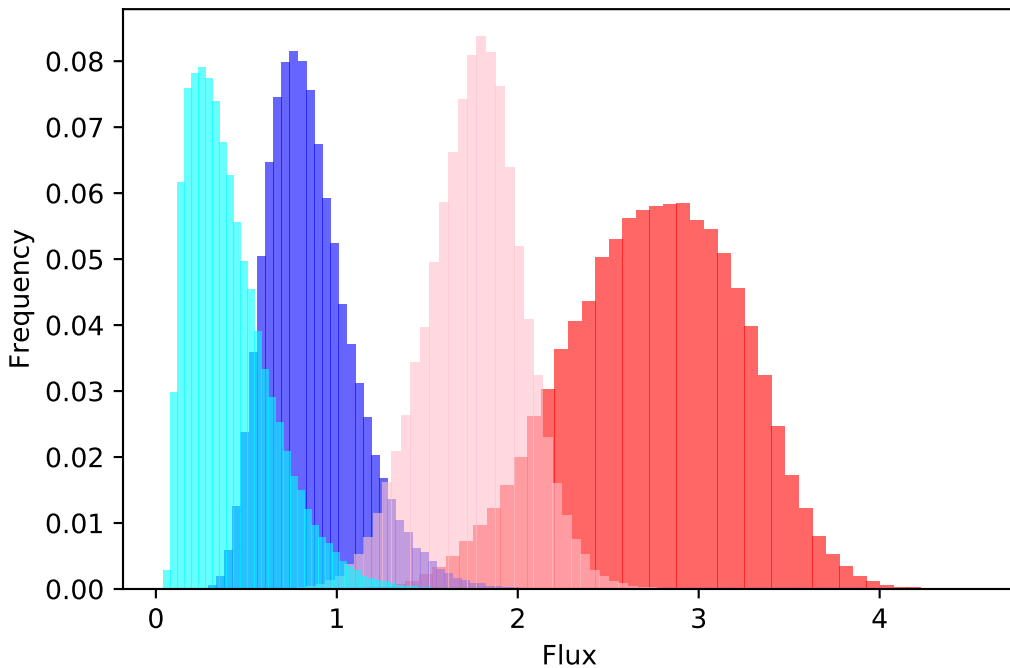
227 : AspP_h + H_h + NADPH_h --> Asp_DASH_SeA_h + NADP_h + Pi_h
['2*AT1G14810']
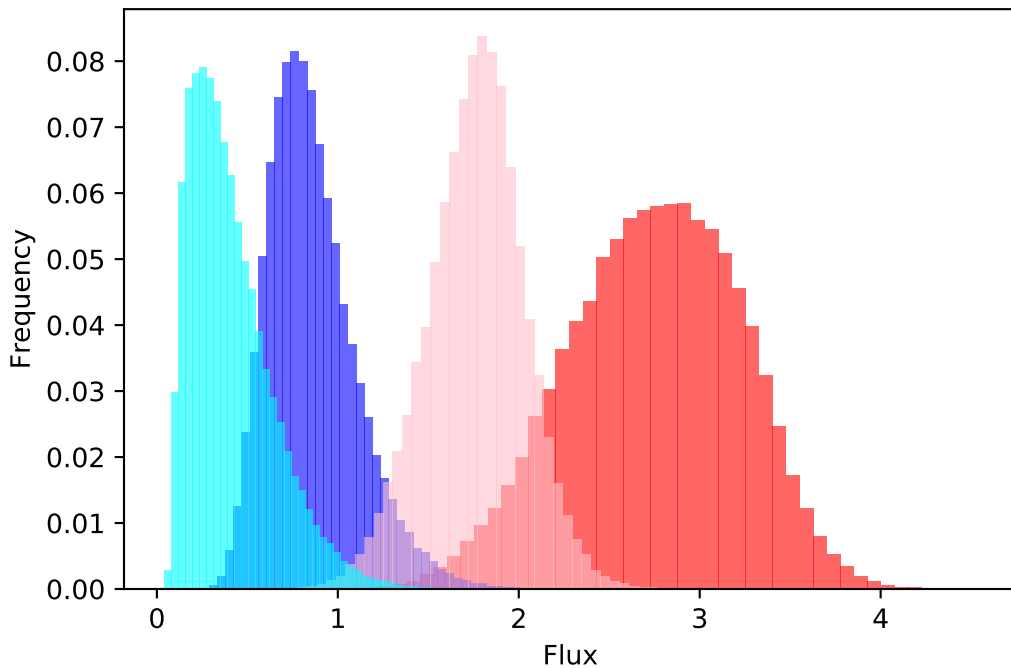
228 : Asp_DASH_SeA_h + Pyr_h --> DHD_h + 2.0 H2O_h + H_h
['AT2G45440', 'AT3G60880']
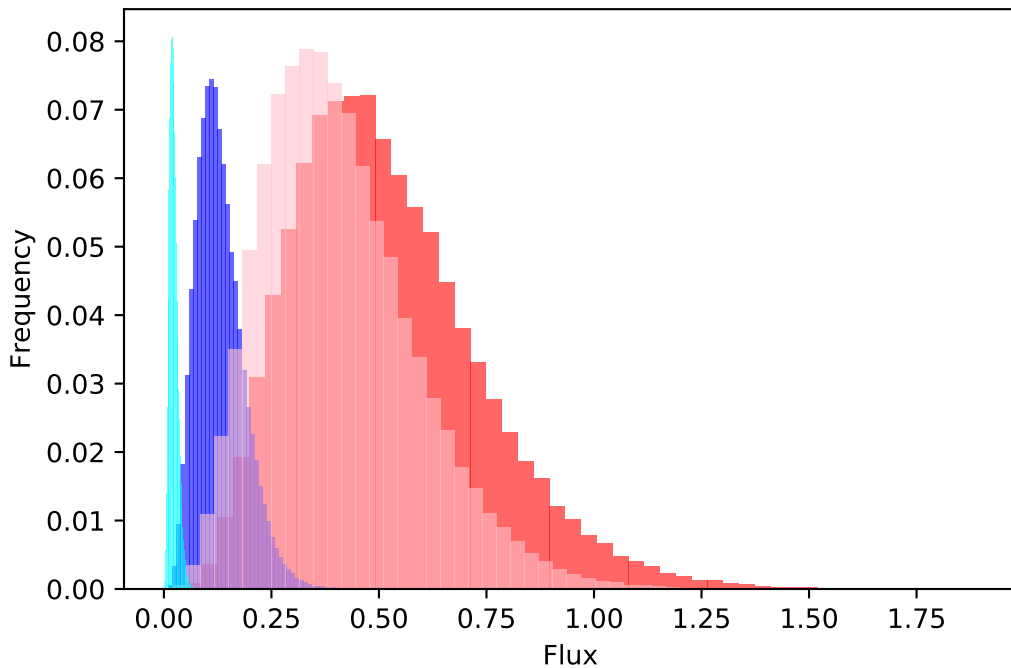
229 : DHD_h + H_h + NADH_h --> NAD_h + THD_h
['AT2G44040', 'AT3G59890', 'AT5G52100']
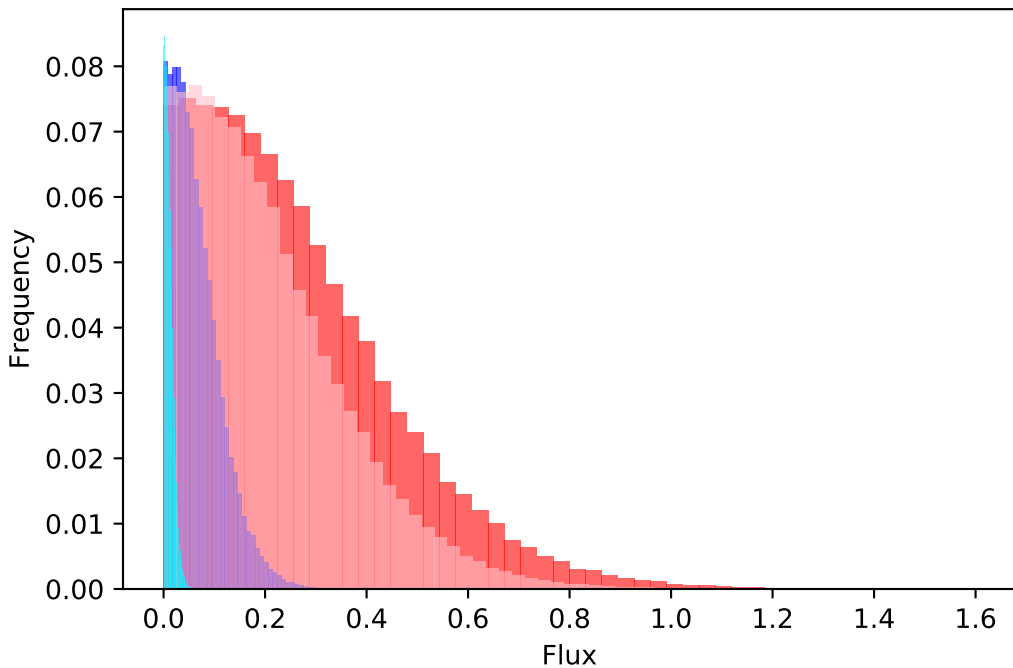
230 : DHD_h + H_h + NADPH_h --> NADP_h + THD_h
['AT2G44040', 'AT3G59890', 'AT5G52100']
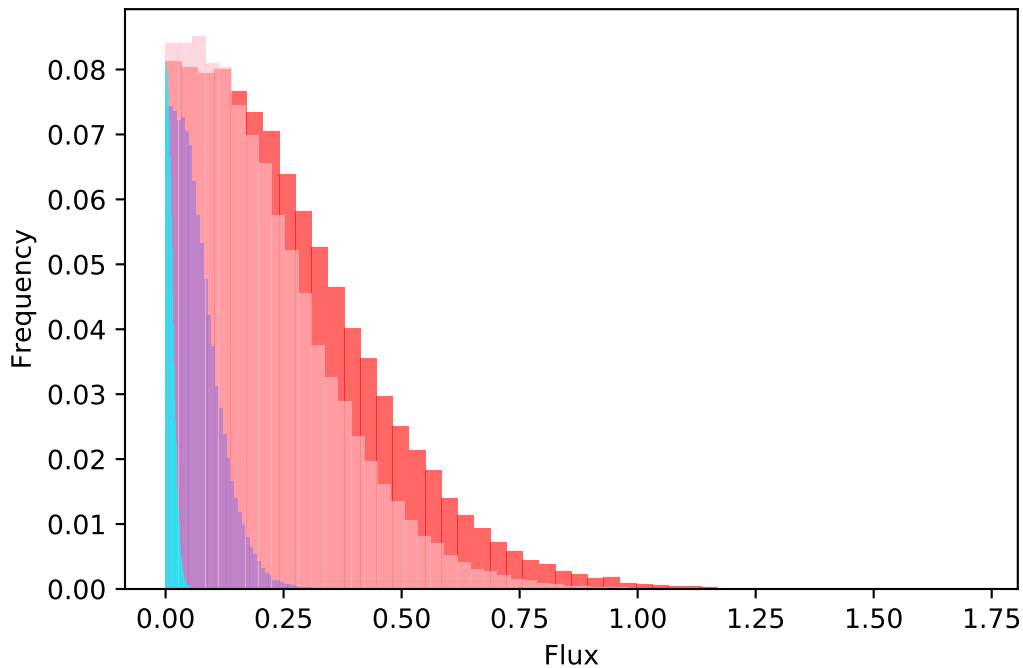
231 : Glu_h + H2O_h + H_h + THD_h --> DAP_h + KG_h
['2*AT4G33680']
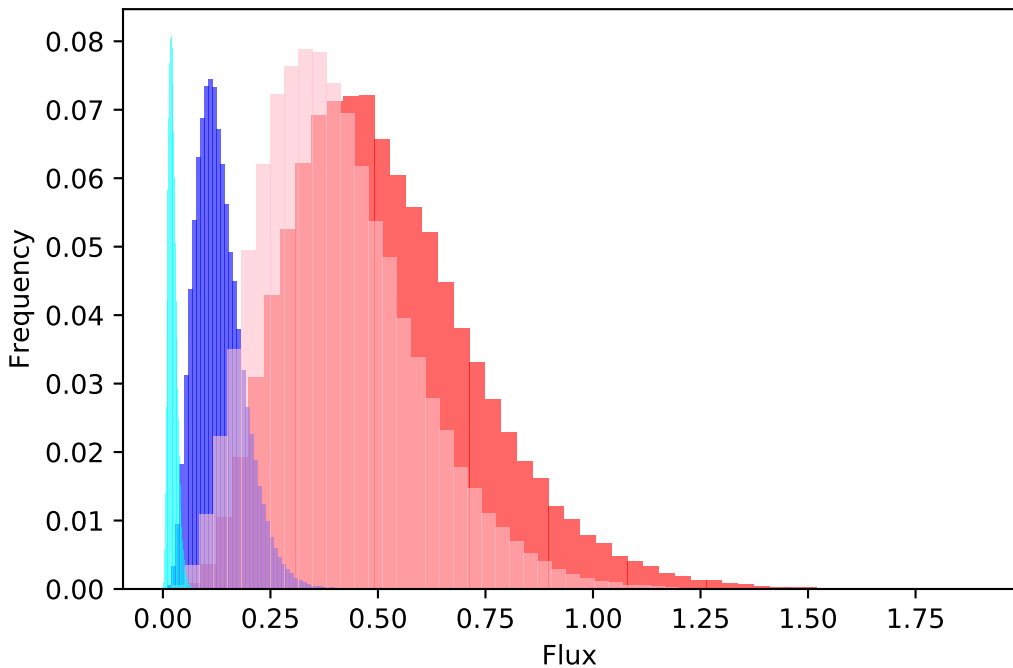
232 : DAP_h --> mDAP_h
['AT3G53580']
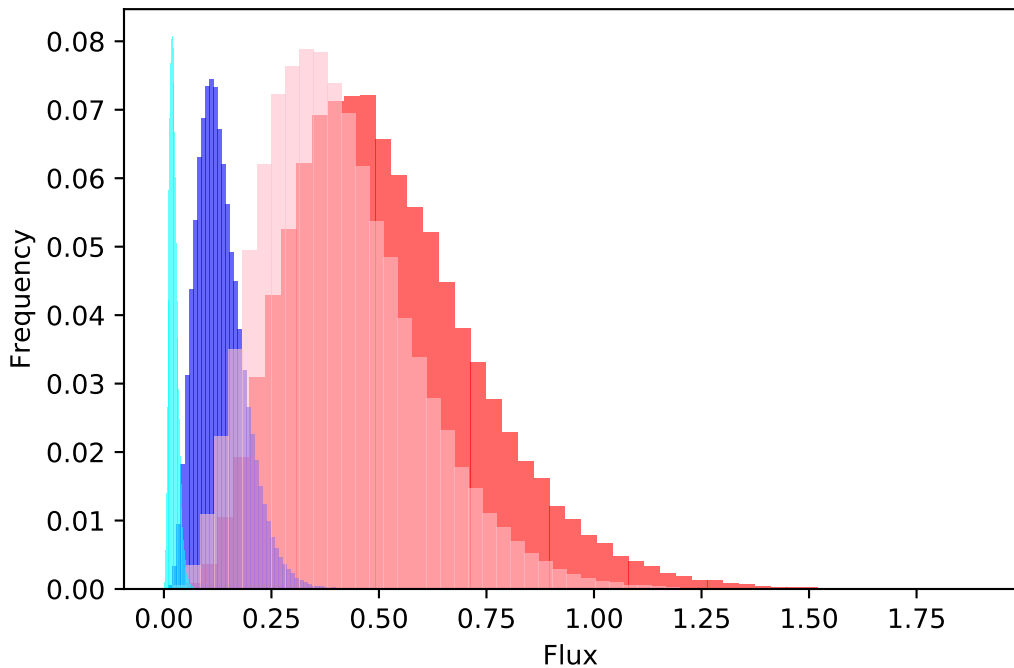
233 : H_h + mDAP_h --> CO2_h + Lys_h
['AT3G14390', 'AT5G11880']
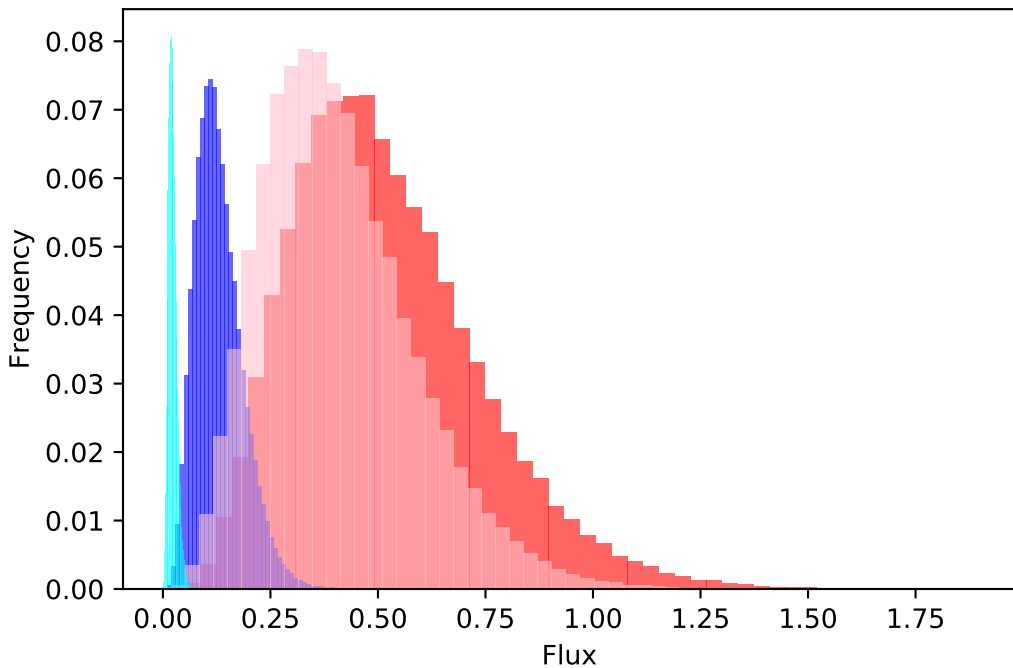
234 : Asp_DASH_SeA_h + H_h + NADPH_h --> H_DASH_Ser_h + NADP_h
['AT4G19710', '4*AT1G31230']
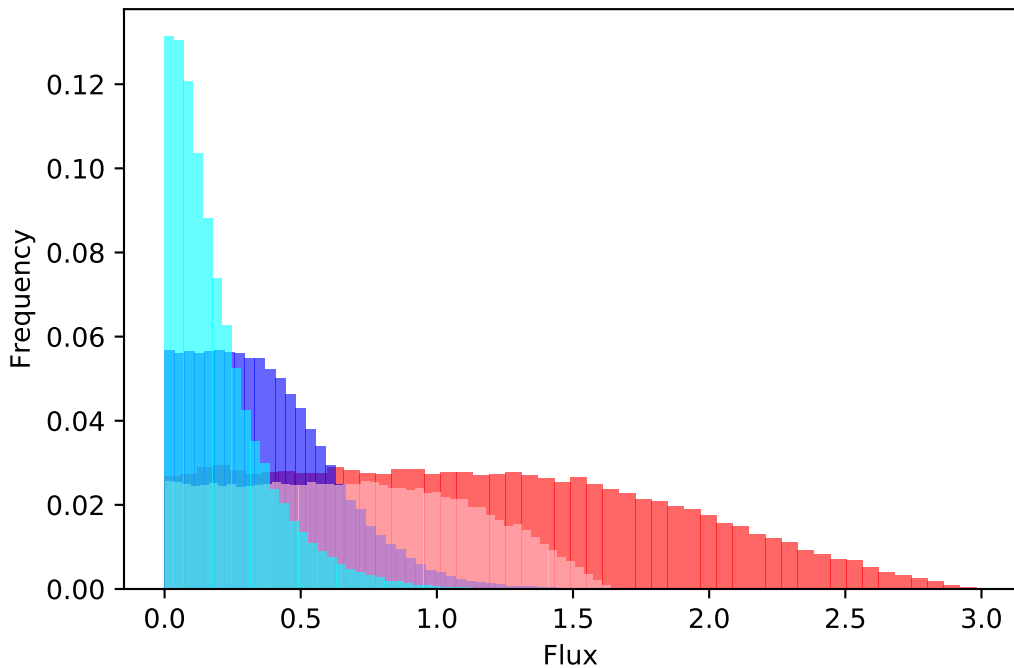
235 : Asp_DASH_SeA_h + H_h + NADH_h --> H_DASH_Ser_h + NAD_h
['AT4G19710', '4*AT1G31230']
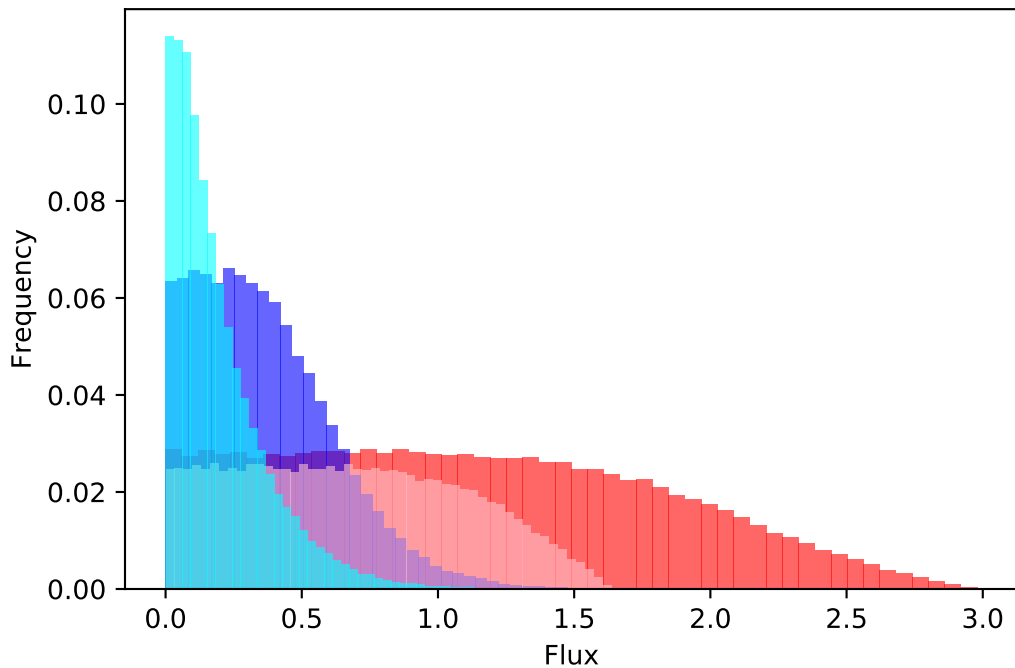
236 : ATP_h + H_DASH_Ser_h --> ADP_h + H_h + PH_DASH_Ser_h
['AT2G17265']
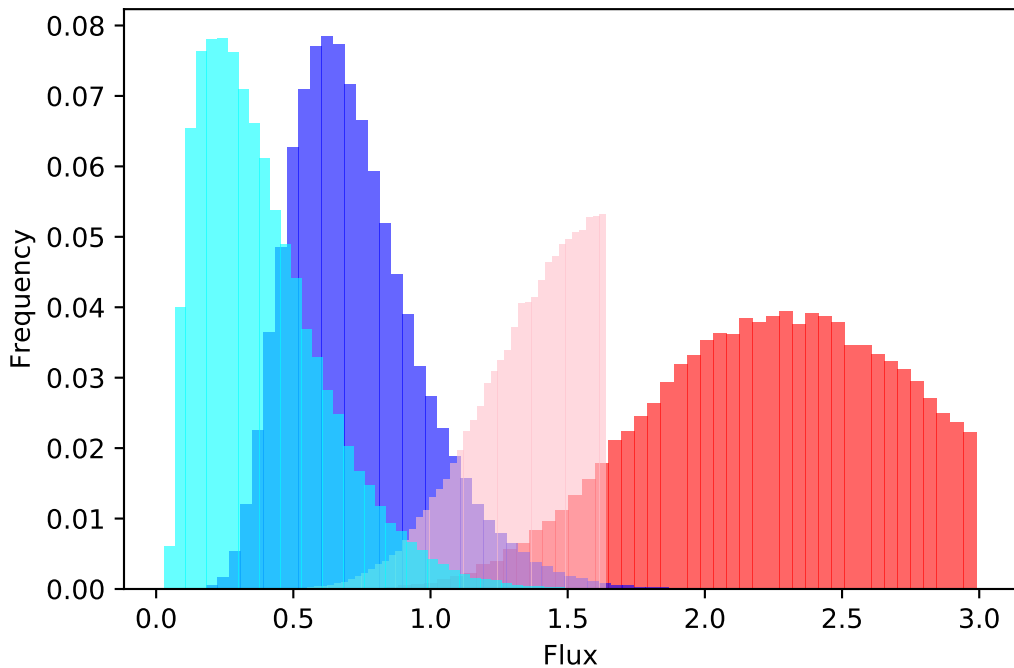
237 : Cys_h + PH_DASH_Ser_h --> CTH_h + Pi_h
['AT3G01120']
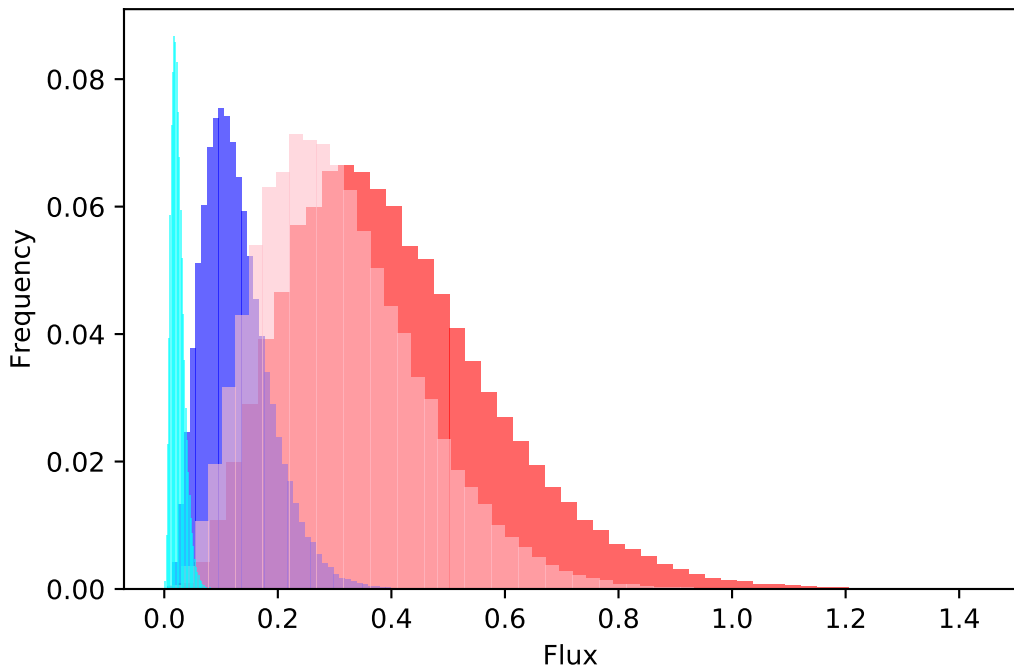
238 : CTH_h + H2O_h --> H_DASH_Cys_h + NH4_h + Pyr_h
['4*AT3G57050']
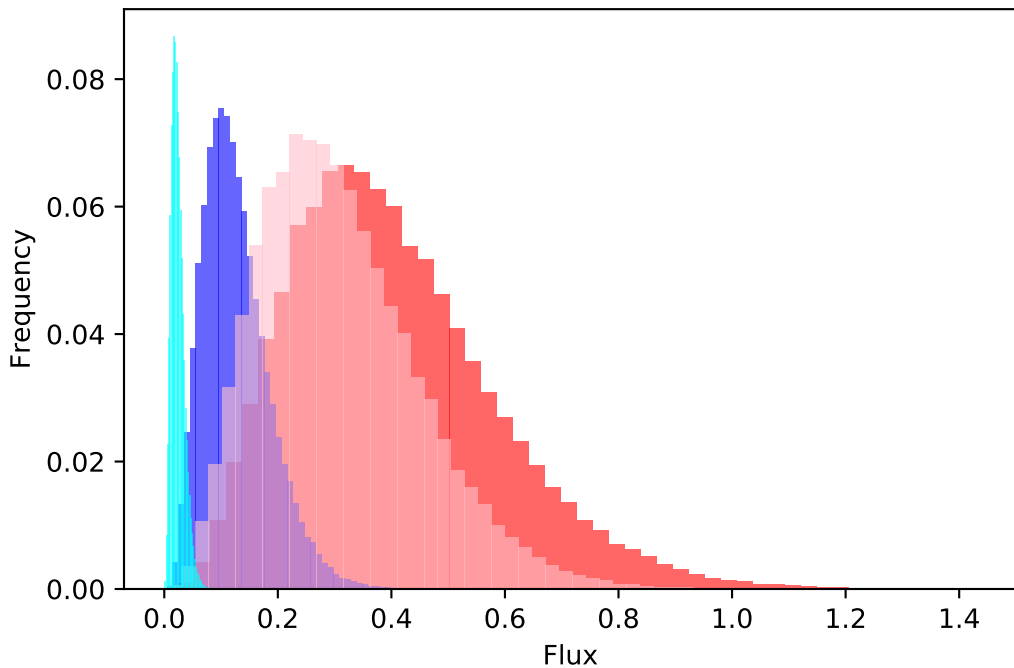
239 : M_DASH_THF_c + NADH_c --> 5M_DASH_THF_c + NAD_c
['AT3G59970', '2*AT2G44160']
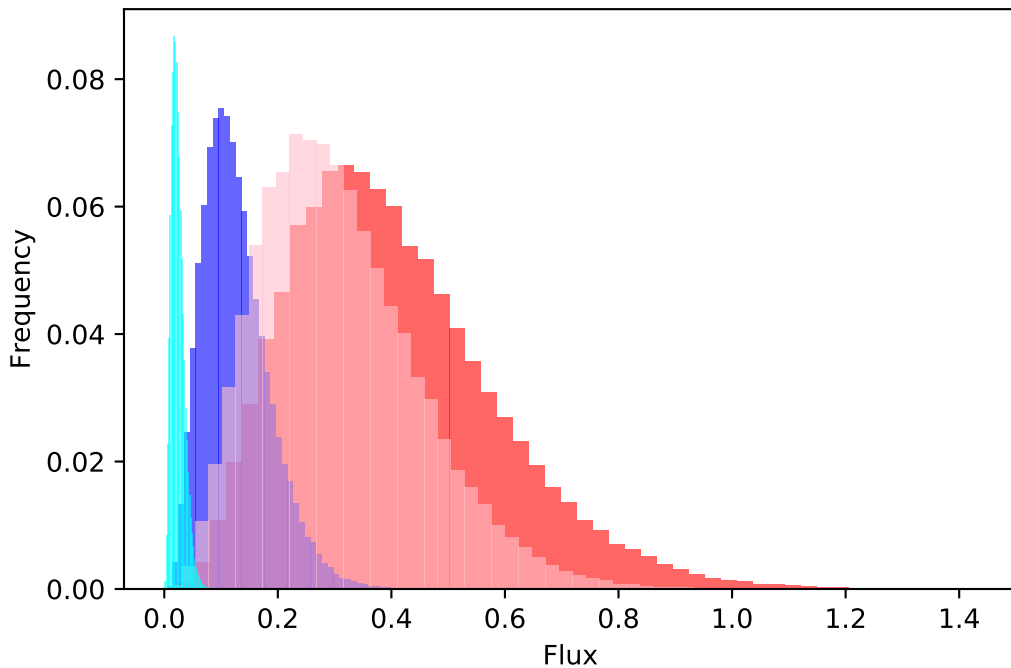
240 : 5M_DASH_THF_c + H_DASH_Cys_c --> Met_c + THF_c
['AT3G03780', 'AT5G17920', 'AT5G20980']
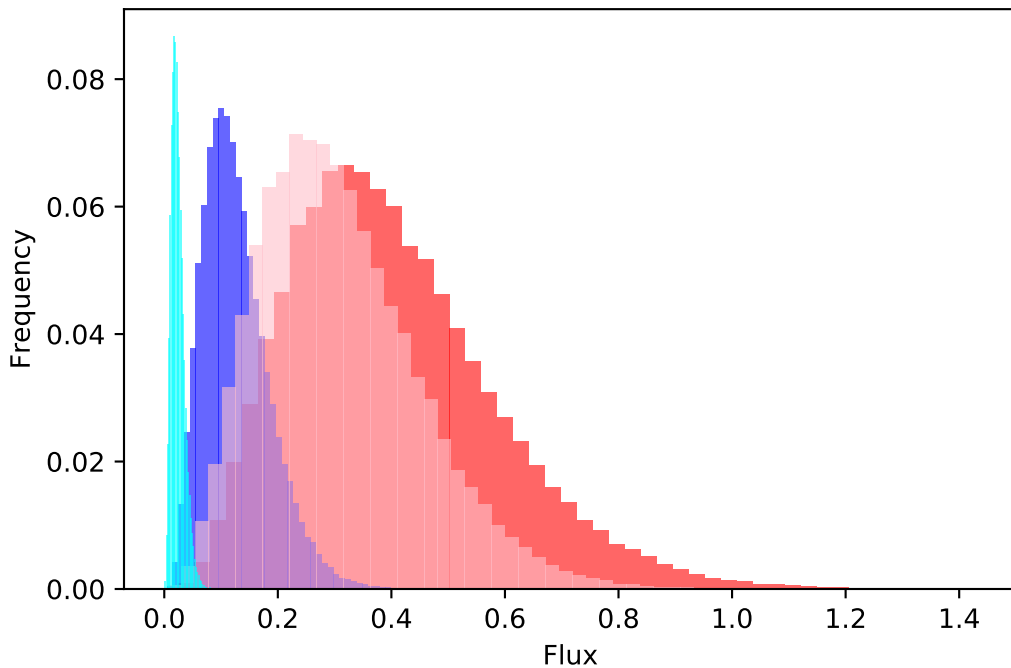
241 : Gly_c + H2O_c + M_DASH_THF_c <=> Ser_c + THF_c
['AT1G22020', 'AT1G36370', 'AT5G26780', '4*AT4G13930', 'AT4G37930', 'AT4G13890']
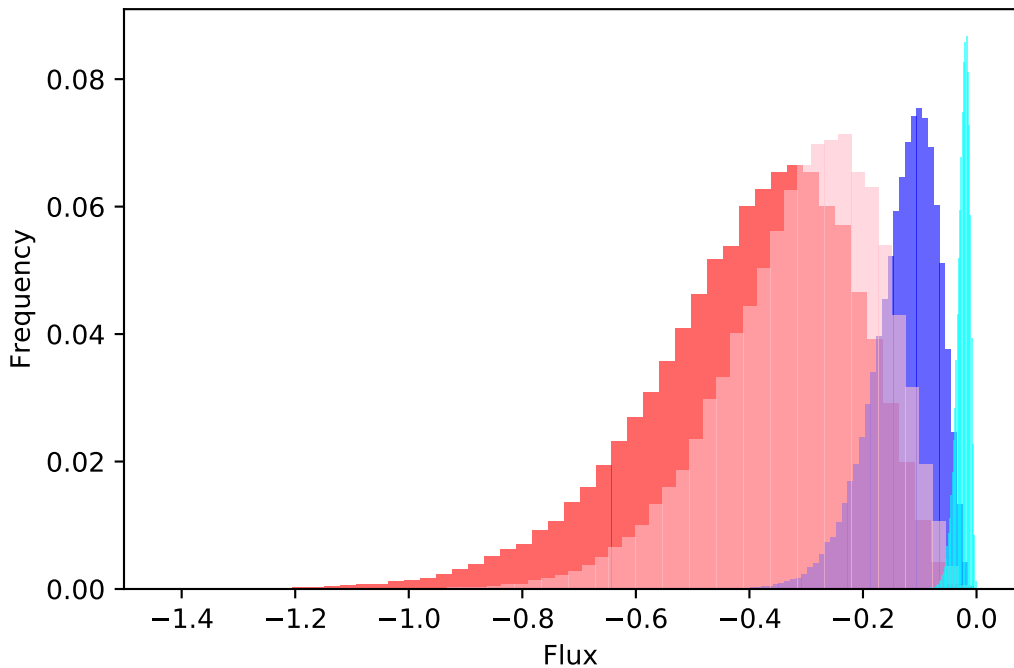
242 : ATP_c + H2O_c + Met_c --> H_c + PPi_c + Pi_c + aMet_c
['AT2G36880', 'AT1G02500']
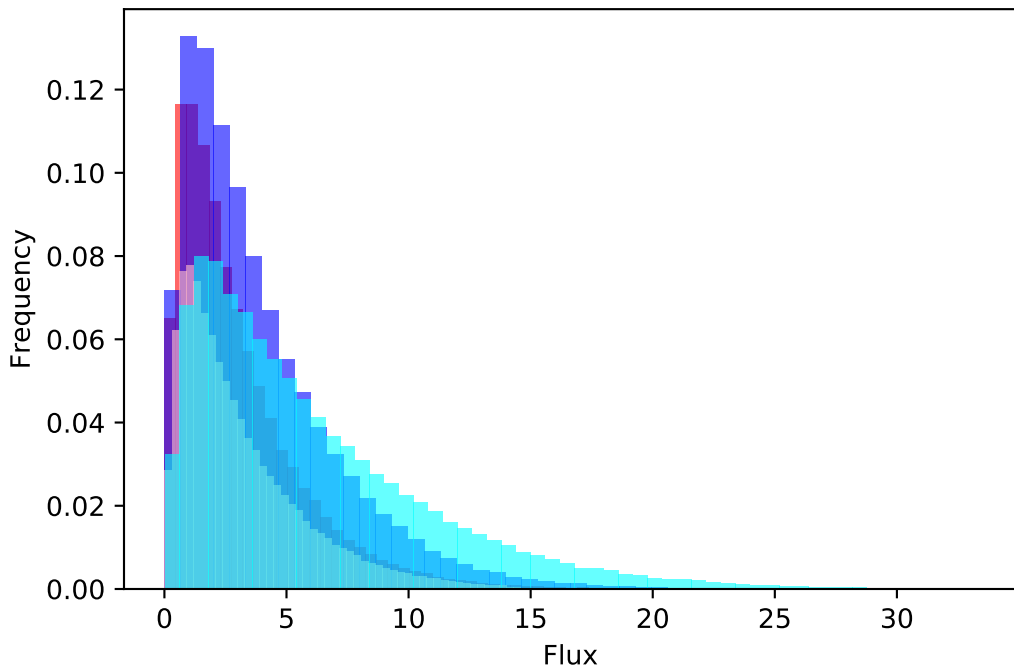
243 : H_DASH_Cys_c + aMet_c --> Met_c + aH_DASH_Cys_c
['AT3G63250', 'AT3G22740', 'AT3G25900']
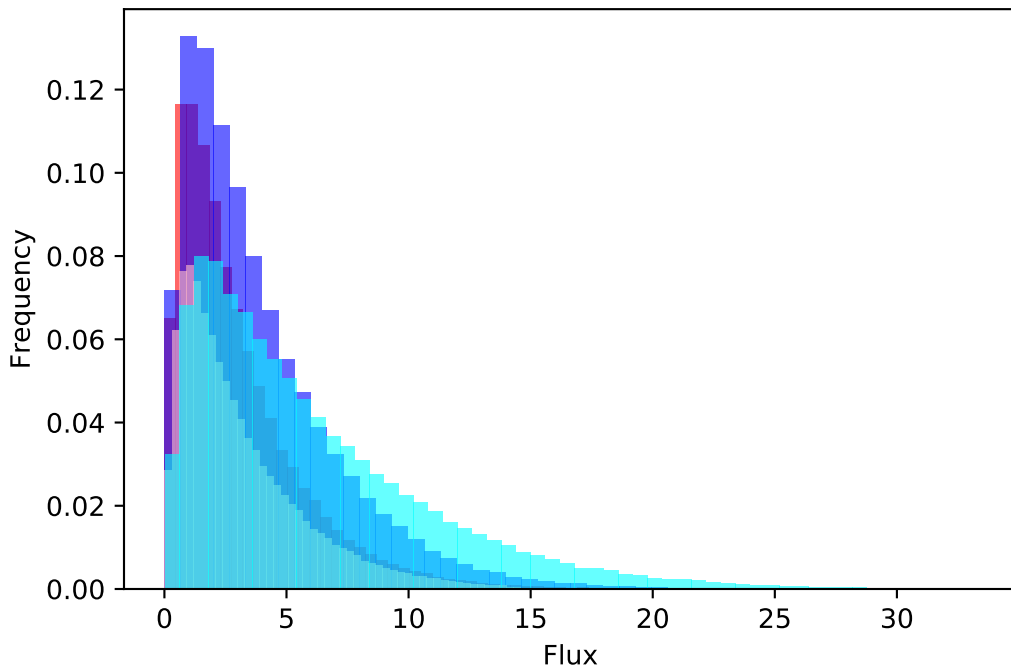
244 : H2O_c + aH_DASH_Cys_c <=> ADN_c + H_DASH_Cys_c
['AT3G23810', 'AT4G13940']
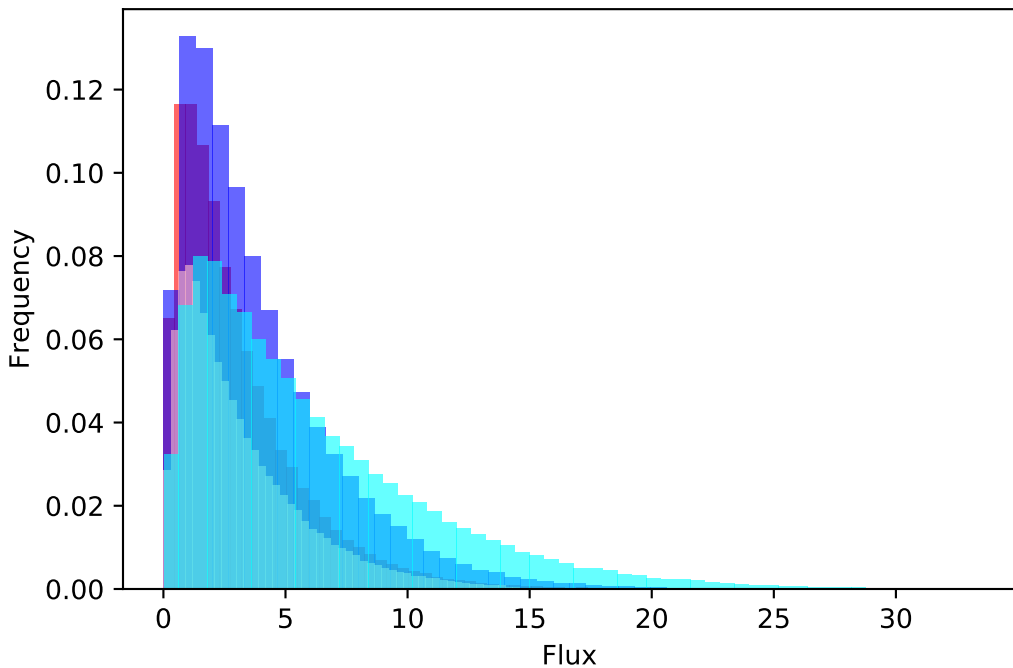
245 : CHR_h --> PRE_h
['AT3G29200', 'AT5G10870', 'AT1G69370']
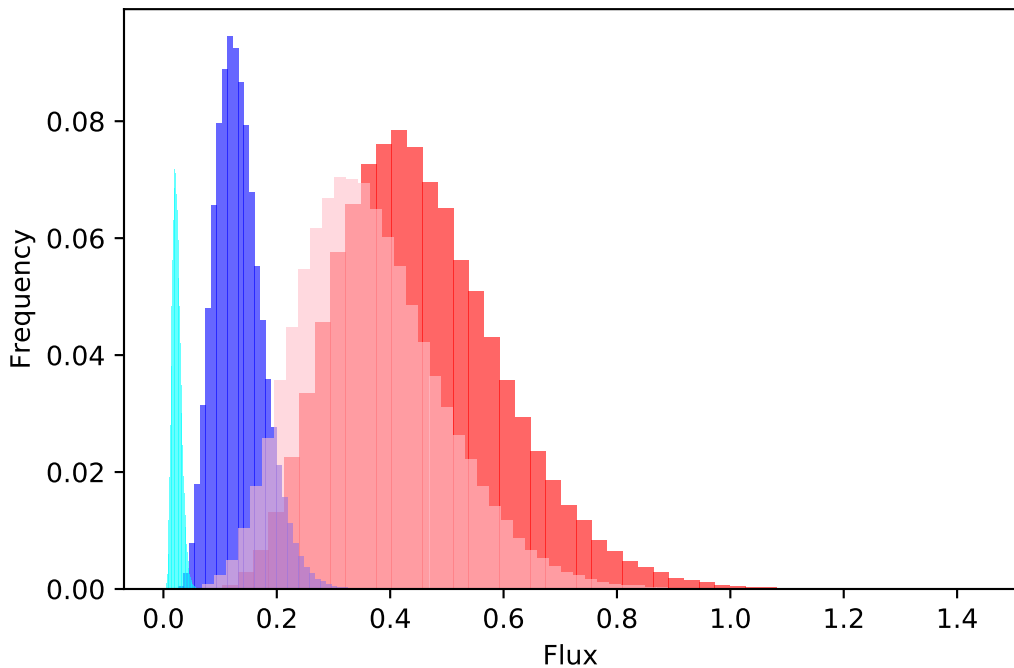
246 : Glu_h + PRE_h <=> AGN_h + KG_h
['AT2G22250']
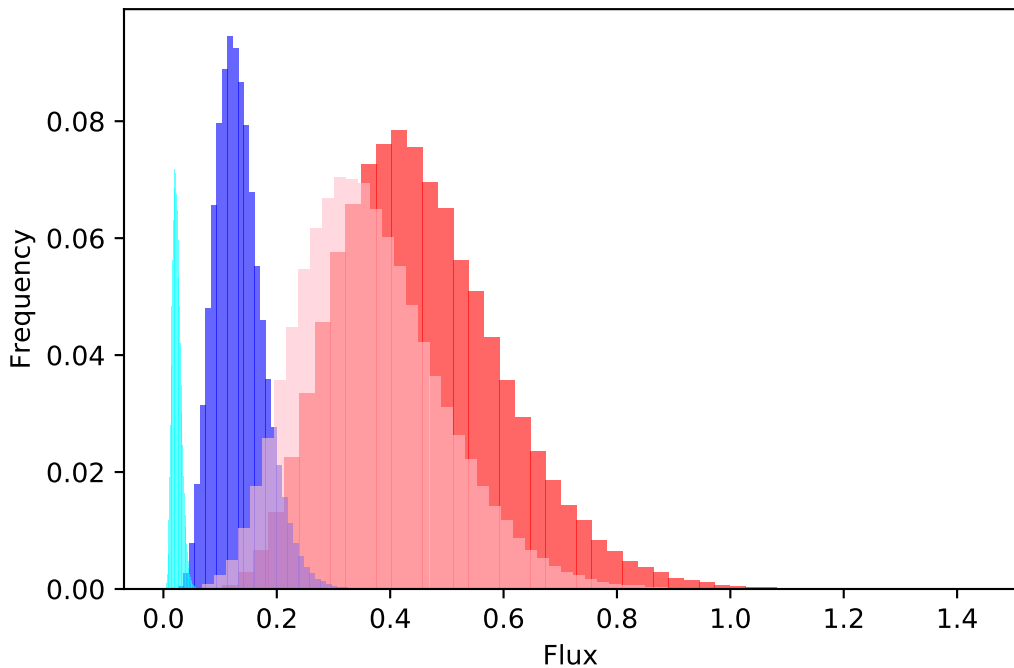
247 : AGN_h + H_h --> CO2_h + H2O_h + Phe_h
['AT1G08250', 'AT2G27820', 'AT3G44720', 'AT1G11790', 'AT5G22630', 'AT3G07630']
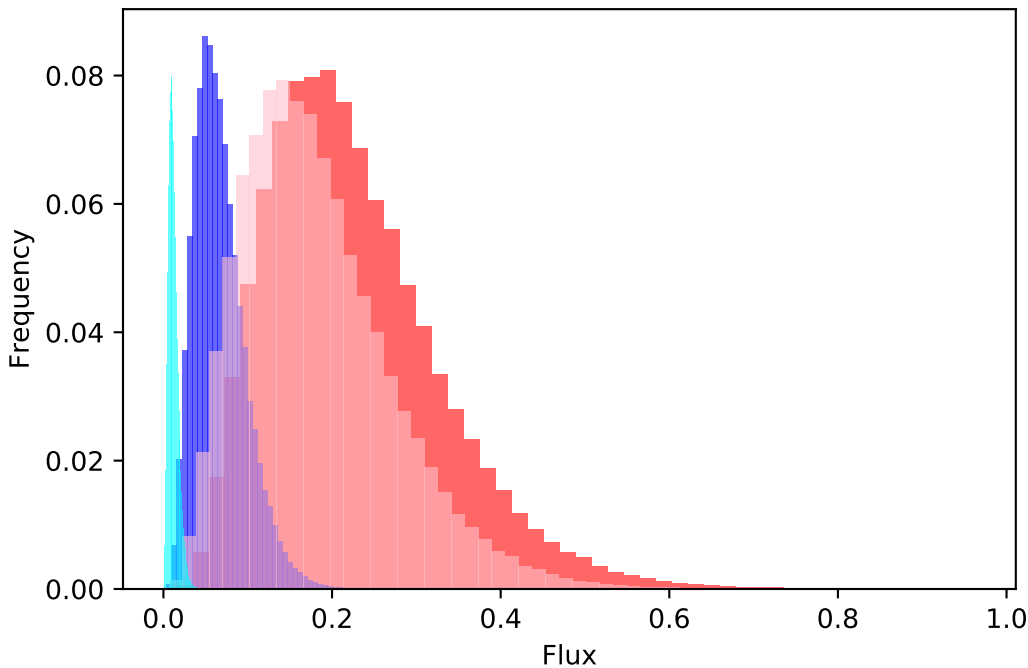
248 : Arg_m + H2O_m + H_m --> Orn_m + urea_m
['AT4G08870', 'AT4G08900']
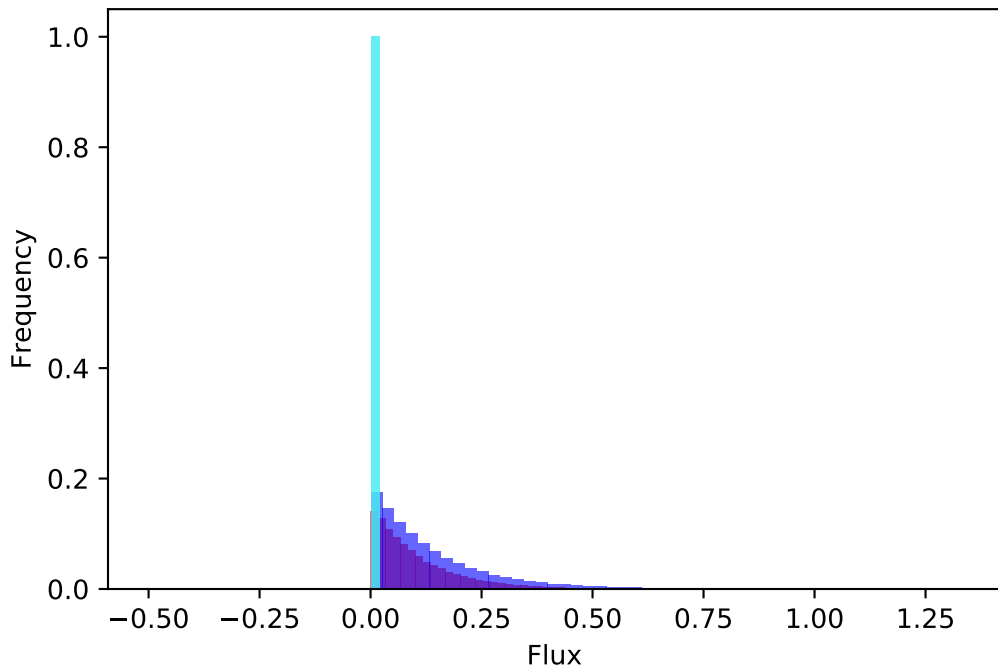
249 : H2O_m + H_m + urea_m --> CO2_m + 2.0 NH4_m
['AT1G67550']
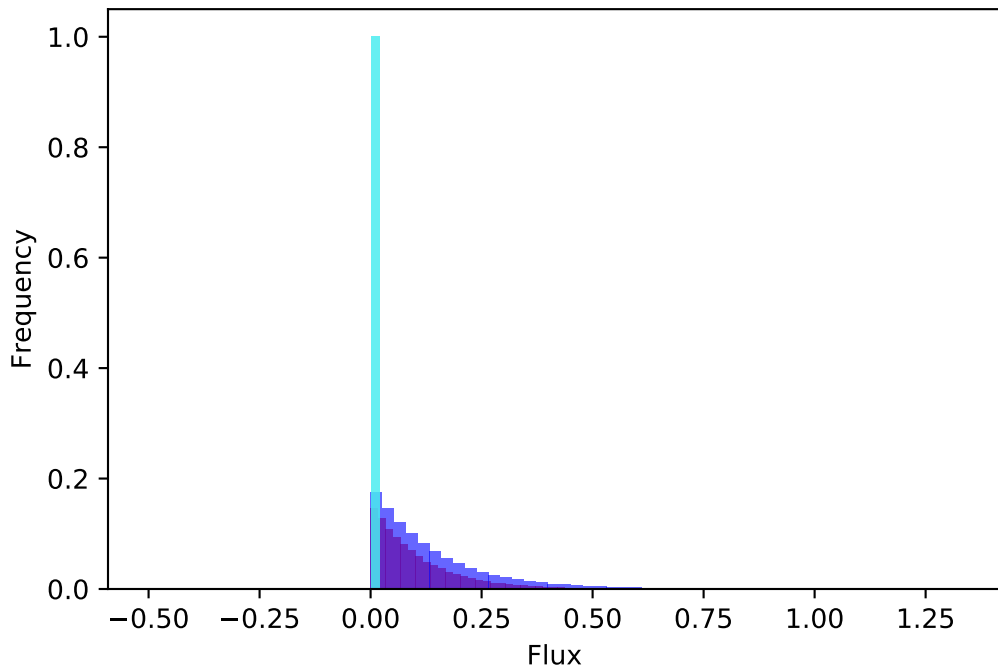
250 : KG_m + Orn_m <=> Glu_DASH_SeA_m + Glu_m
['AT5G46180']
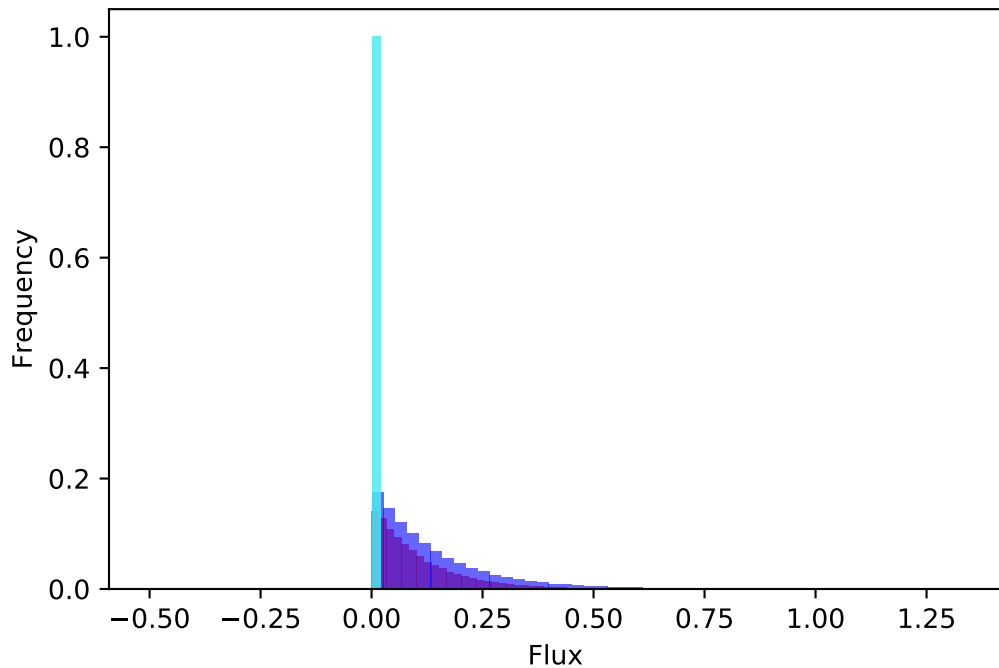
251 : ATP_c + Glu_c --> ADP_c + GluP_c
['AT3G55610', 'AT2G39800']
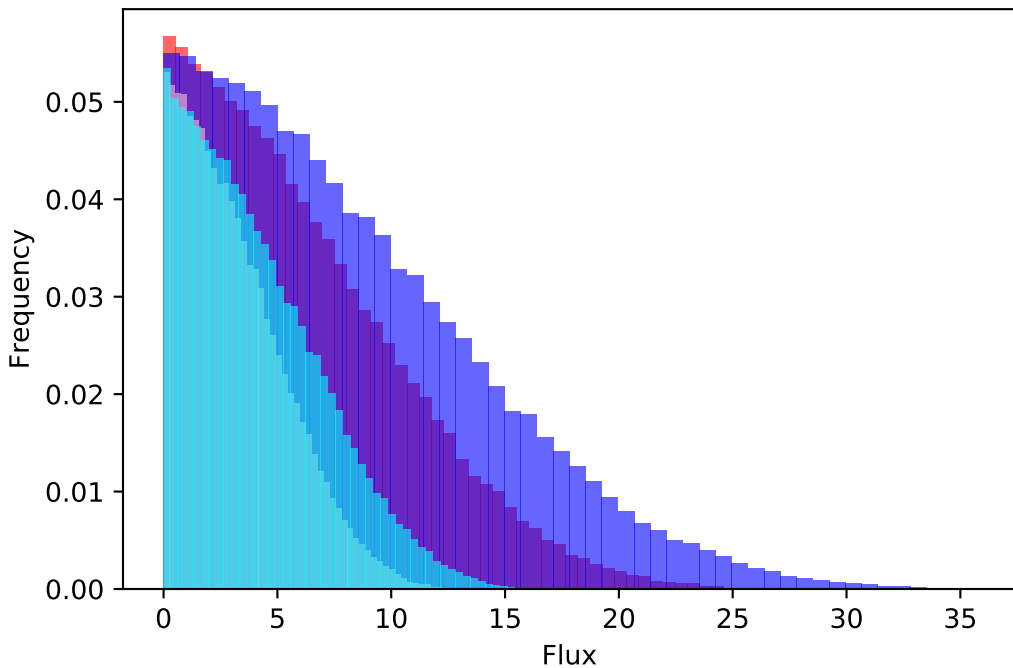
252 : ATP_h + Glu_h --> ADP_h + GluP_h
['AT3G55610', 'AT2G39800']
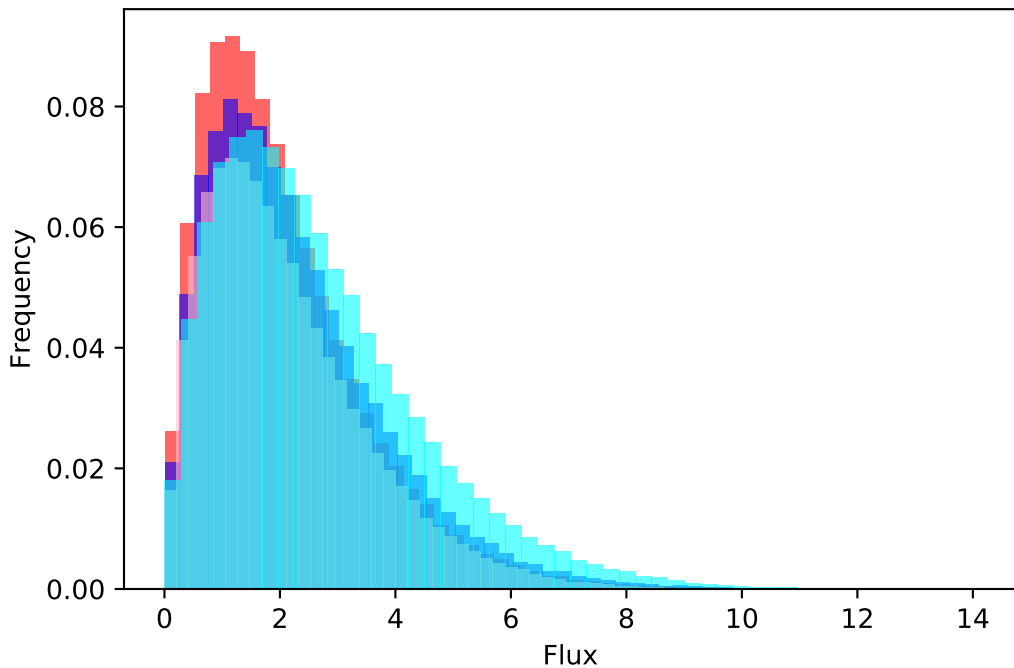
253 : ATP_m + Glu_m --> ADP_m + GluP_m
['AT3G55610', 'AT2G39800']
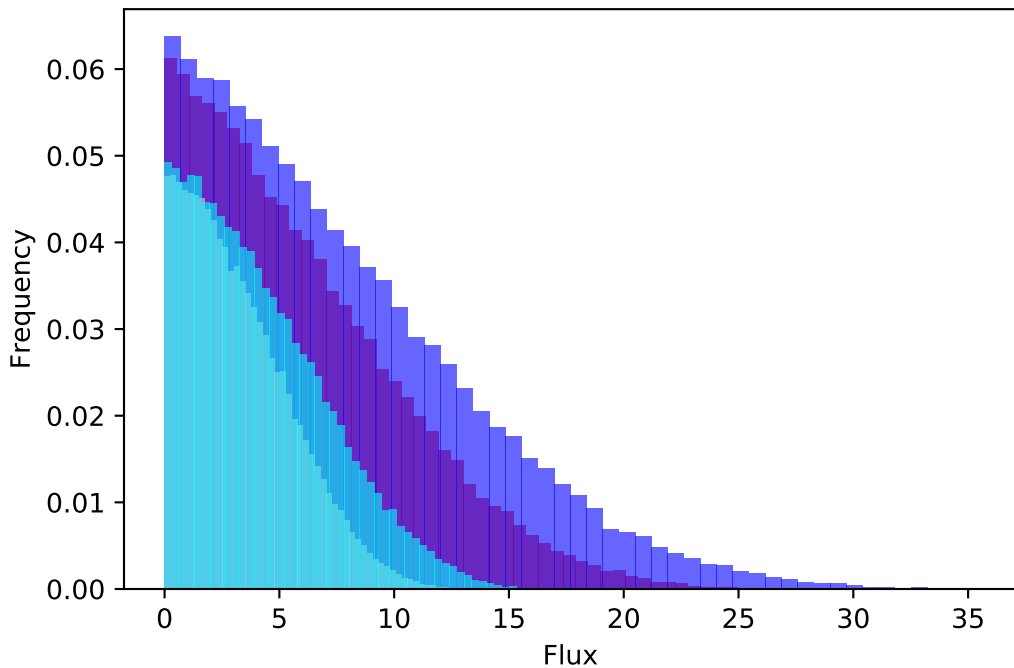
254 : GluP_c + NADPH_c --> Glu_DASH_SeA_c + NADP_c + Pi_c
['AT3G55610', 'AT2G39800']
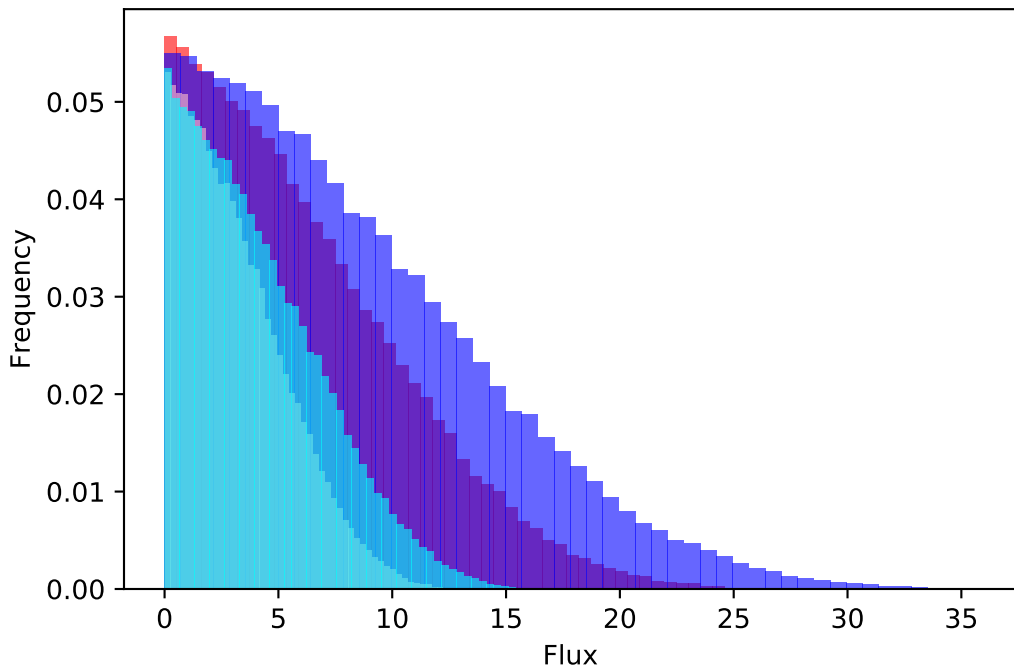
255 : GluP_h + H_h + NADPH_h --> Glu_DASH_SeA_h + NADP_h + Pi_h
['AT3G55610', 'AT2G39800']
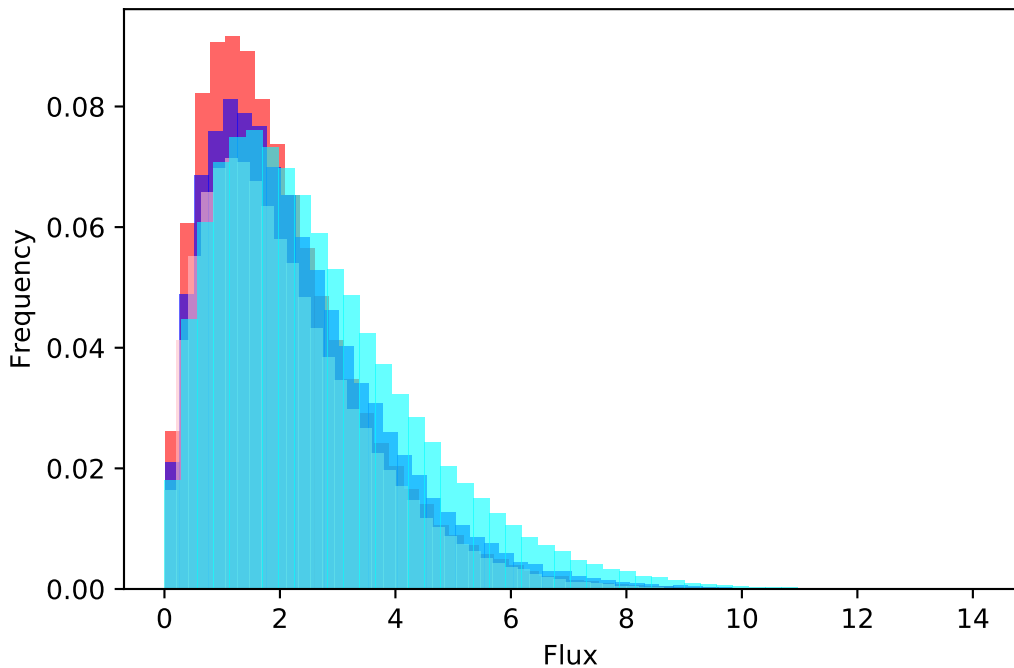
256 : GluP_m + H_m + NADPH_m --> Glu_DASH_SeA_m + NADP_m + Pi_m
['AT3G55610', 'AT2G39800']
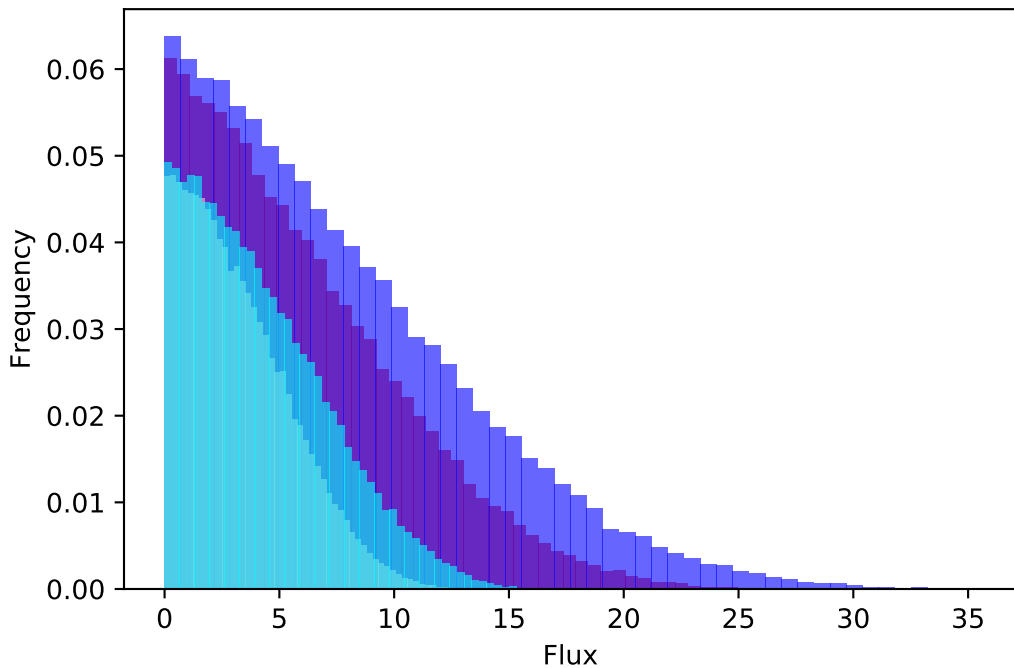
257 : Glu_DASH_SeA_c --> H2O_c + H_c + P5C_c
['-']
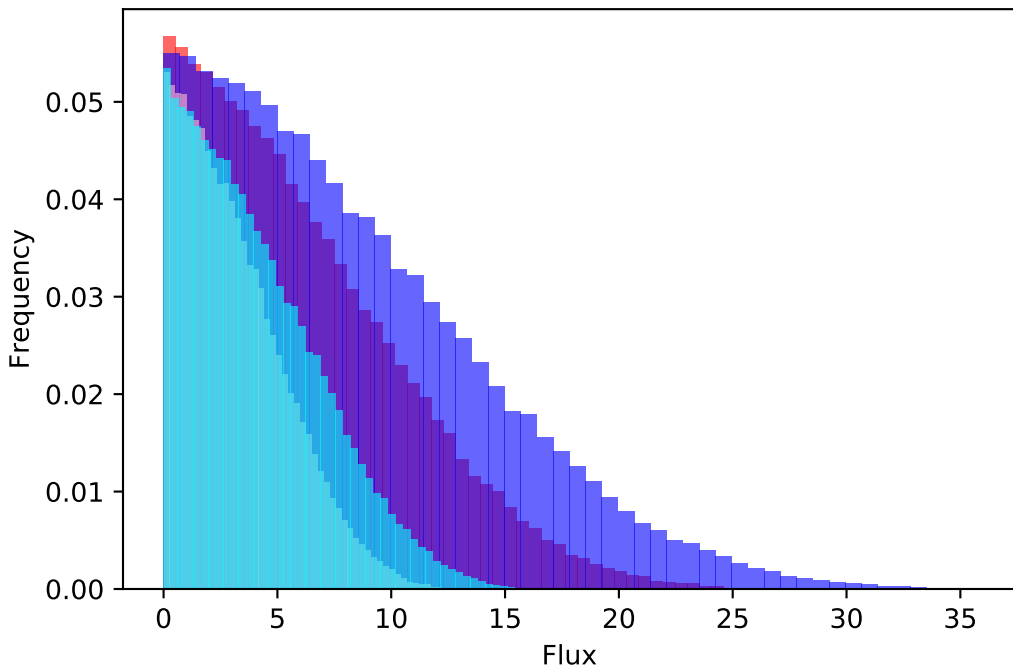
258 : Glu_DASH_SeA_h --> H2O_h + H_h + P5C_h
['-']
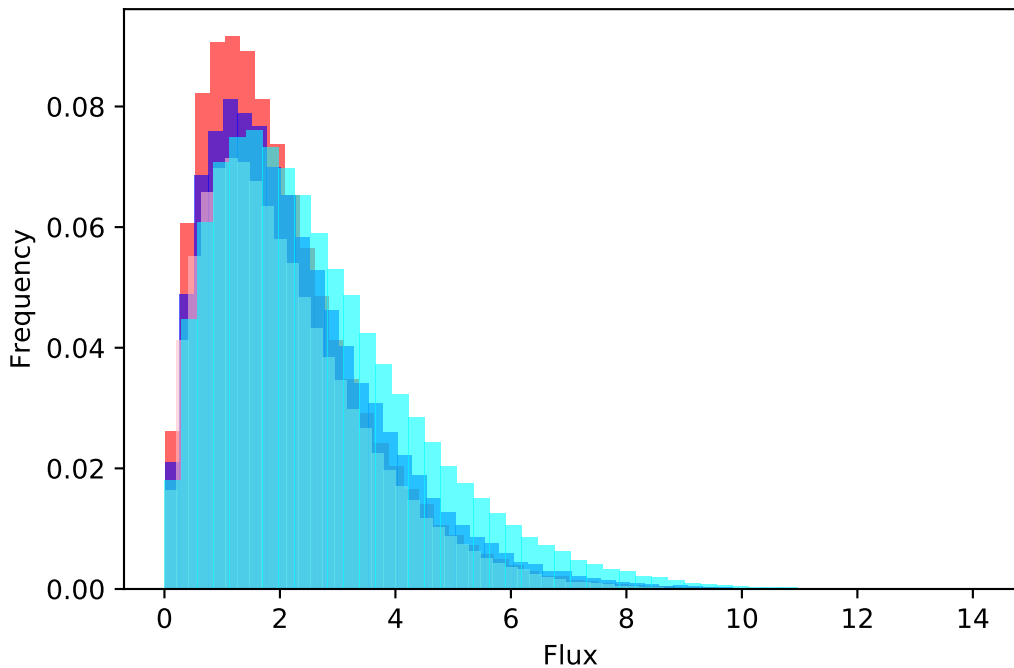
259 : Glu_DASH_SeA_m --> H2O_m + H_m + P5C_m
['-']
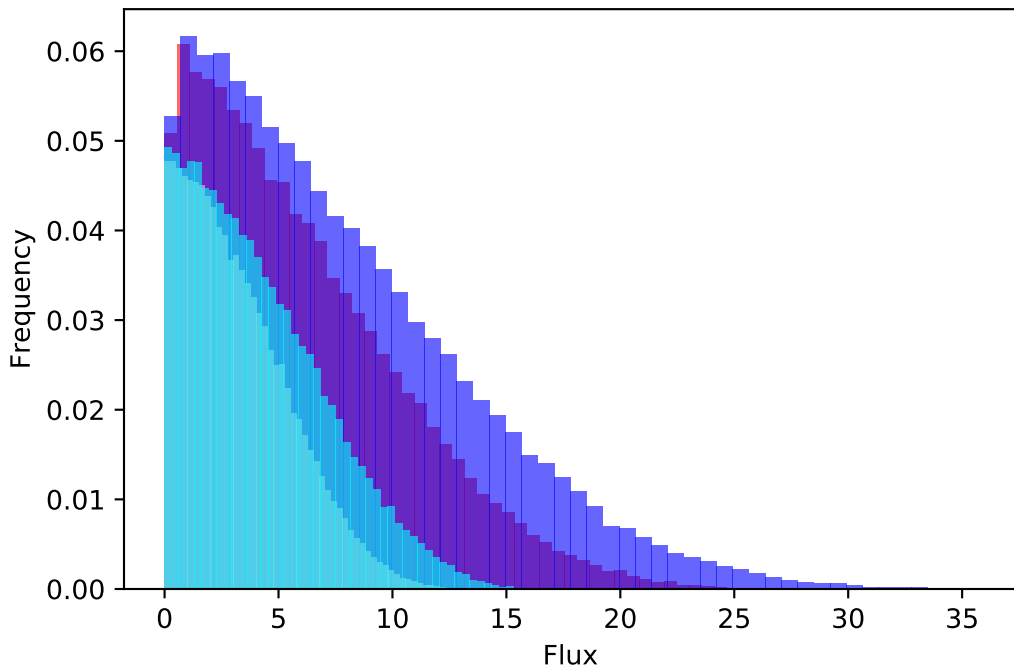
260 : H_c + NADH_c + P5C_c --> NAD_c + Pro_c
['AT5G14800']
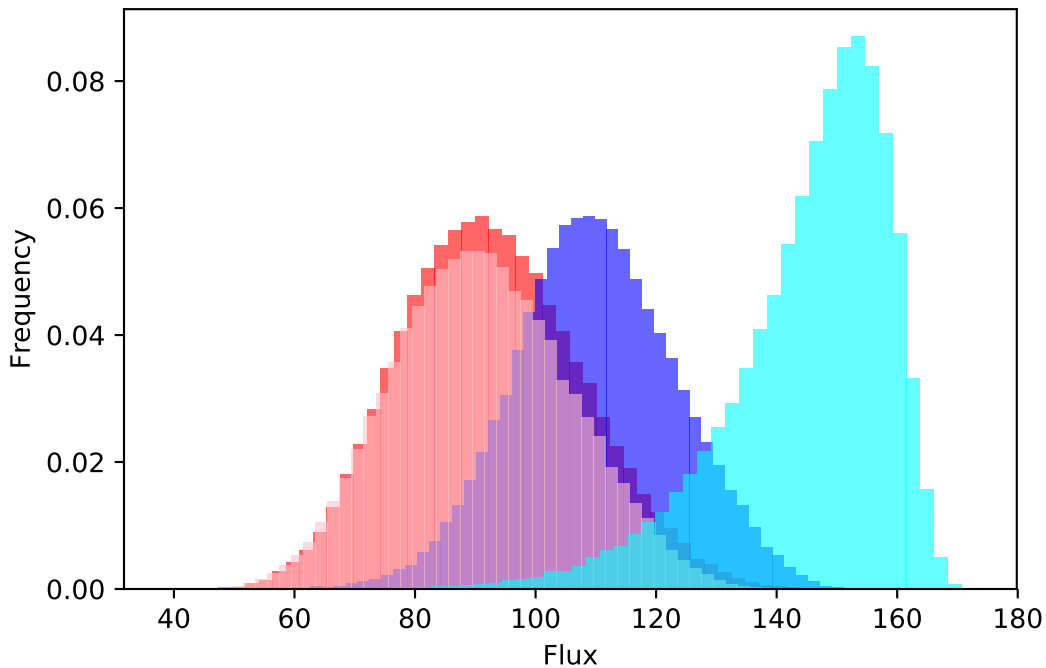
261 : NAD_m + Pro_m --> 2.0 H_m + NADH_m + P5C_m
['AT5G38710', 'AT3G30775']
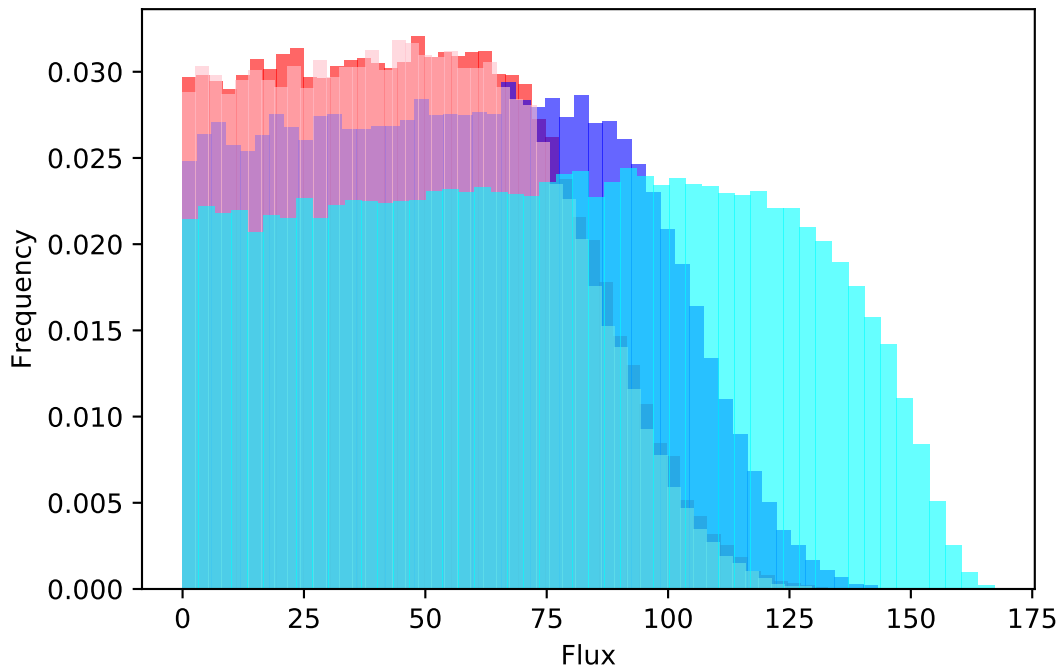
262 : NADP_m + Pro_m --> 2.0 H_m + NADPH_m + P5C_m
['AT5G38710', 'AT3G30775']
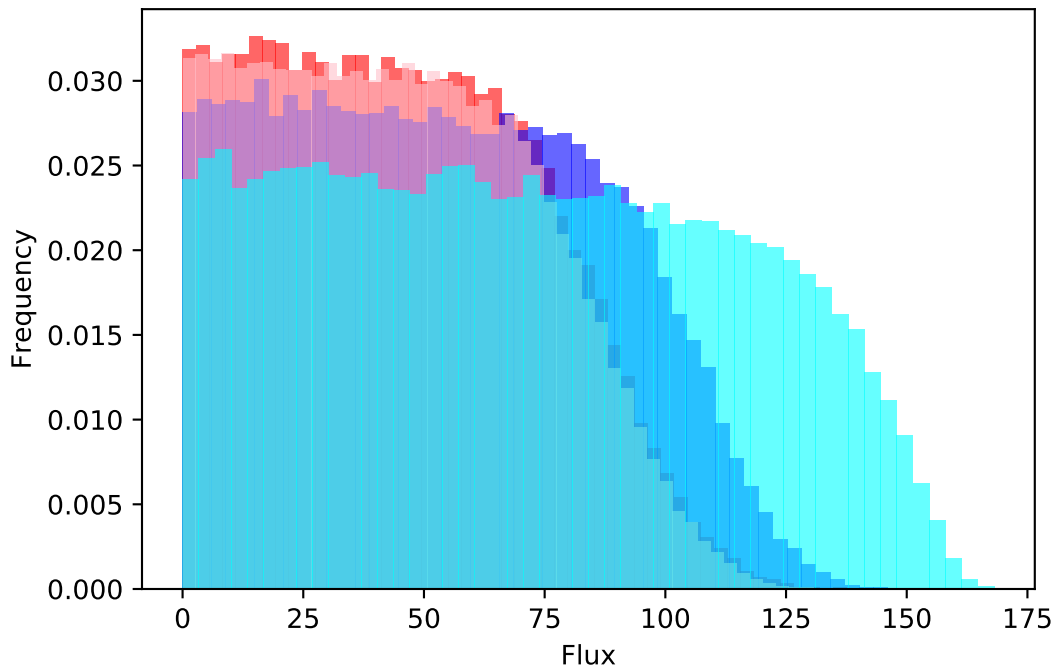
263 : 2.0 H2O_h + NAD_h + P5C_h --> Glu_h + H_h + NADH_h
['AT5G62530']
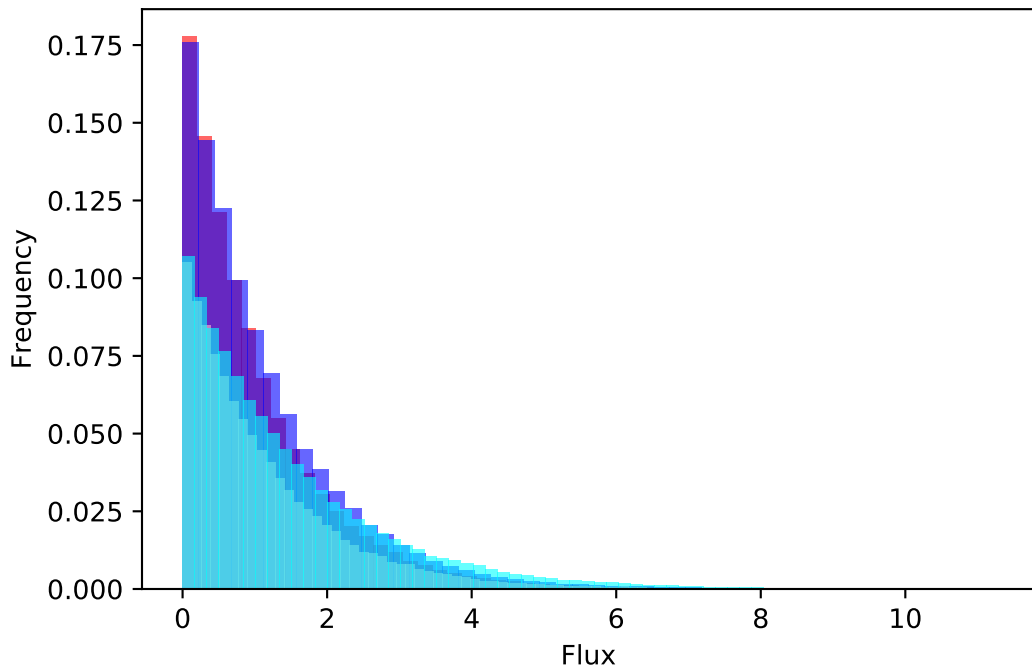
264 : 2.0 H2O_m + NAD_m + P5C_m --> Glu_m + H_m + NADH_m
['AT5G62530']
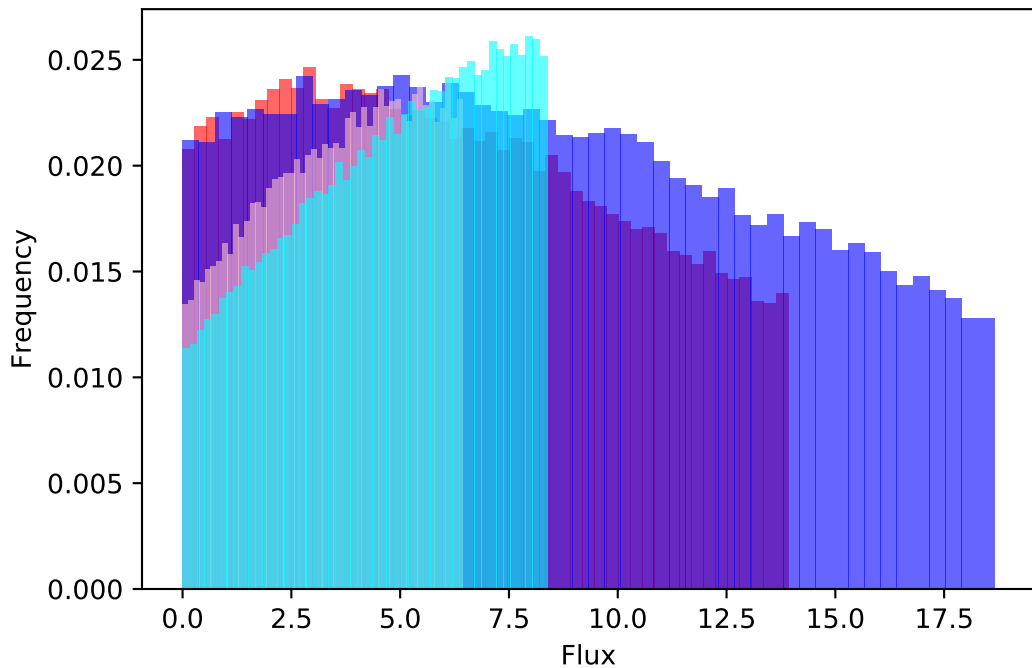
265 : 2.0 H2O_m + NADP_m + P5C_m --> Glu_m + H_m + NADPH_m
['AT5G62530']
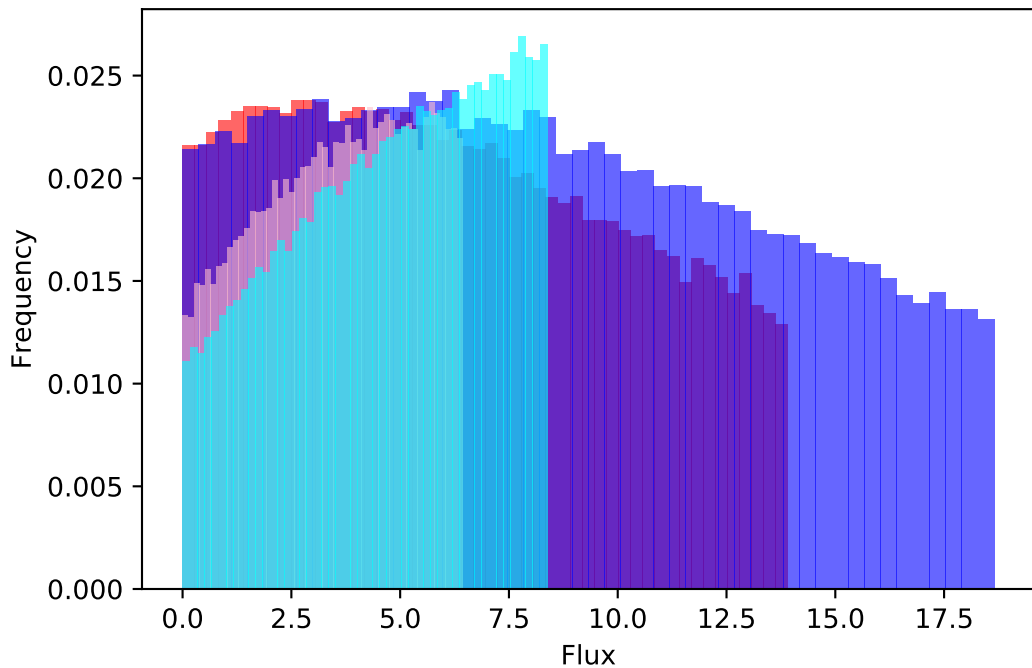
266 : NAD_h + PGA_h <=> H_h + NADH_h + P_DASH_HPR_h
['AT1G17745', 'AT4G34200', 'AT3G19480']
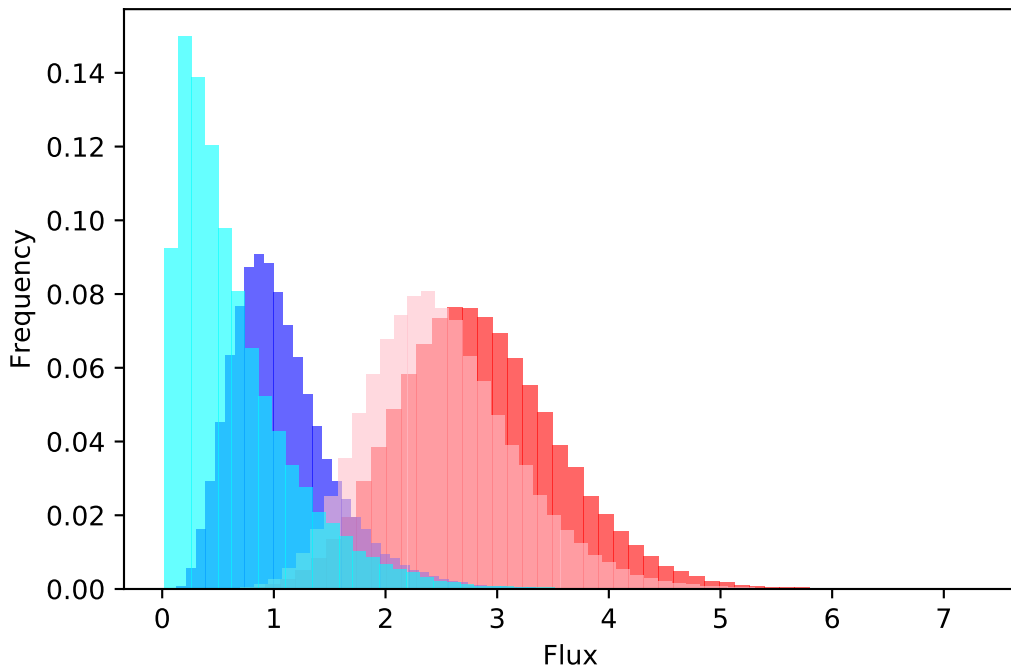
267 : Glu_h + P_DASH_HPR_h --> KG_h + PSer_h
['AT2G17630', 'AT4G35630']
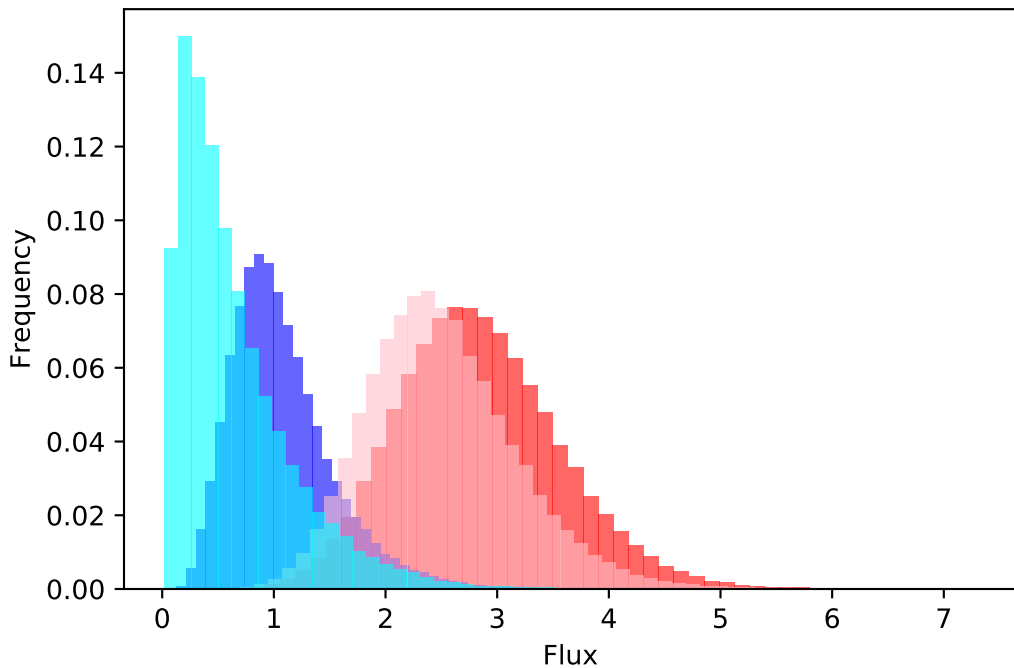
268 : H2O_h + PSer_h --> Pi_h + Ser_h
['AT1G18640']
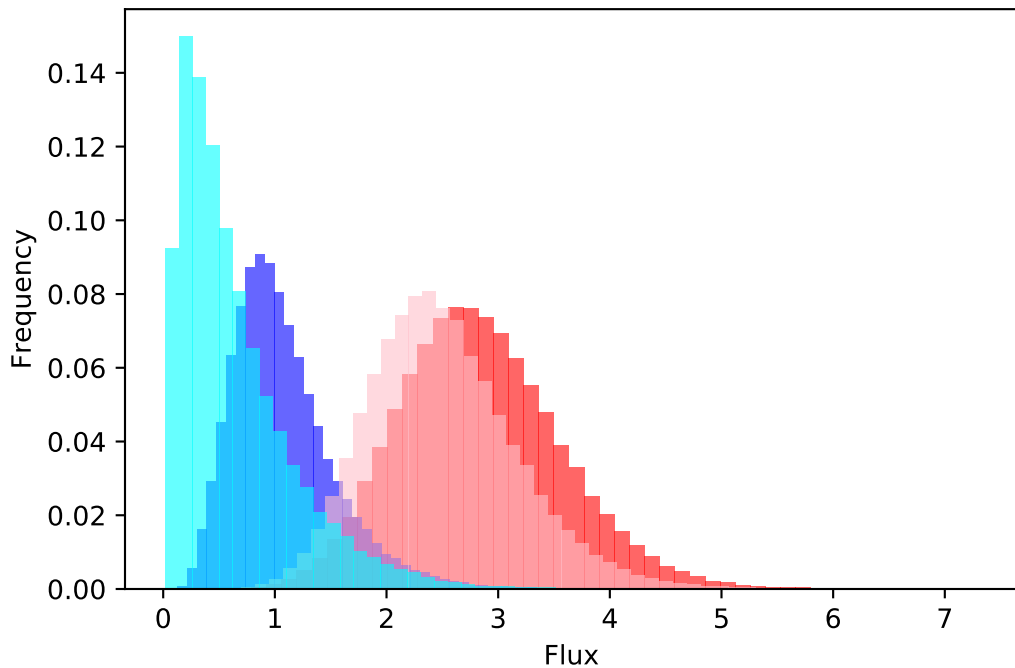
269 : Ser_c --> NH4_c + Pyr_c
['AT4G11640']
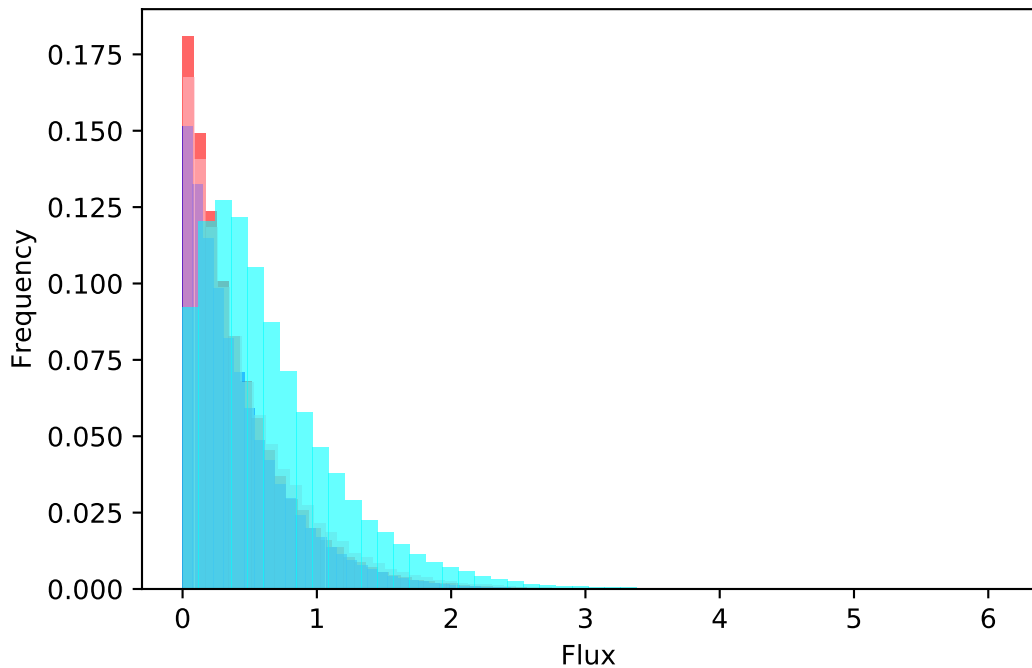
270 : H2O_h + PH_DASH_Ser_h --> Pi_h + Thr_h
['AT1G72810', '2*AT4G29840']
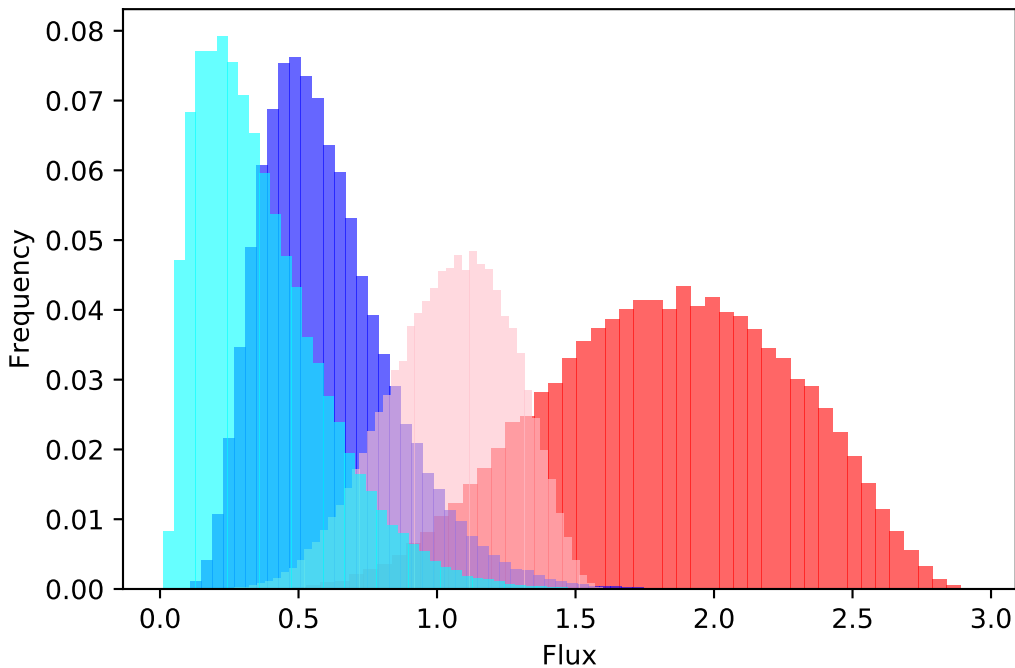
271 : CHR_h + Gln_h --> ANT_h + Glu_h + H_h + Pyr_h
['2*AT3G55870', 'AT2G29690', 'AT5G05730', '2*AT1G24807']
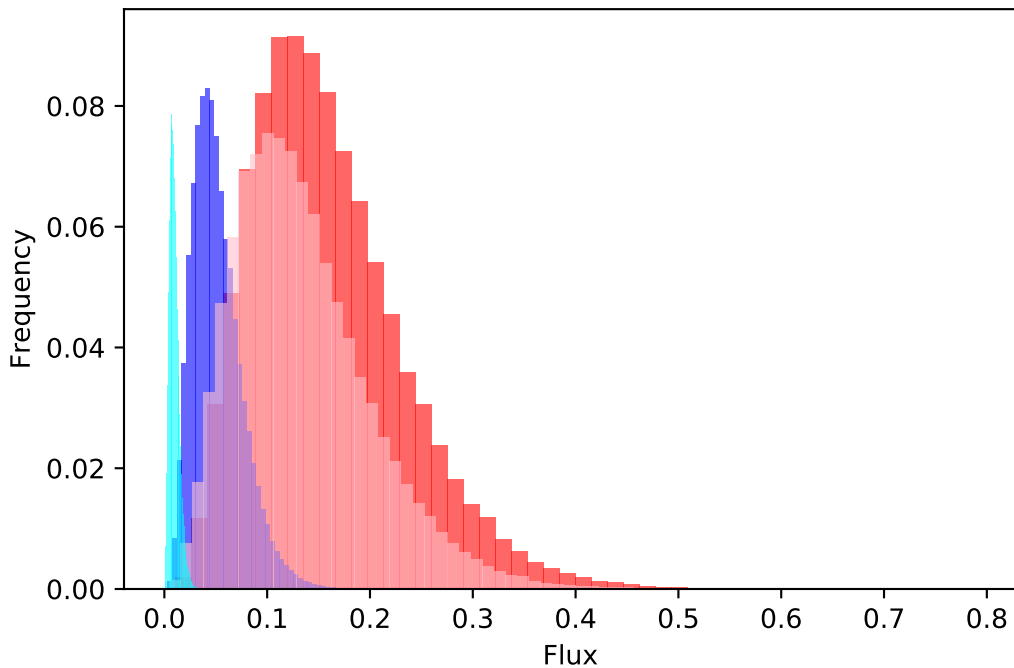
272 : ANT_h + PRPP_h --> H_h + PPi_h + PR_DASH_ANT_h
['AT5G17990']
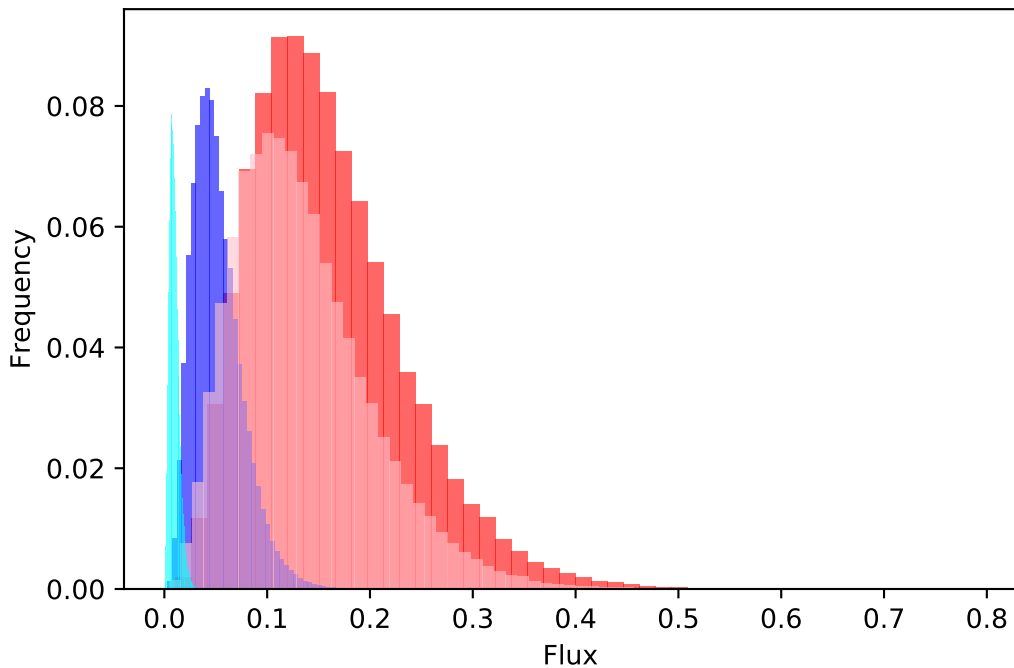
273 : PR_DASH_ANT_h --> CPD_DASH_Ru5P_h
['AT5G05590', 'AT1G07780', 'AT1G29410']
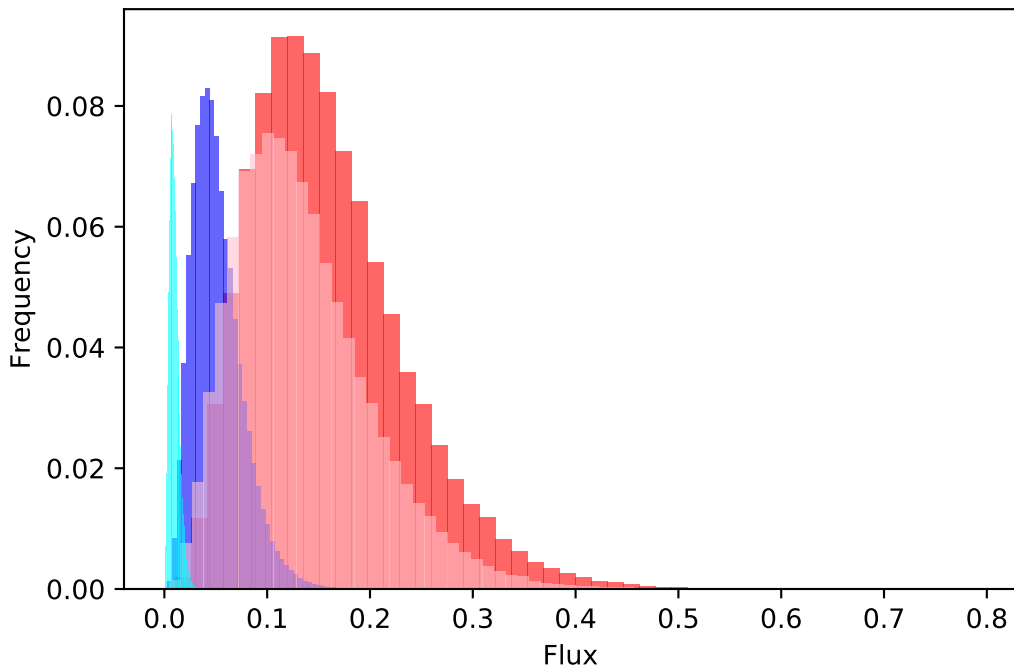
274 : CPD_DASH_Ru5P_h + H_h --> CO2_h + H2O_h + Ind_DASH_GP_h
['AT2G04400', 'AT5G48220']
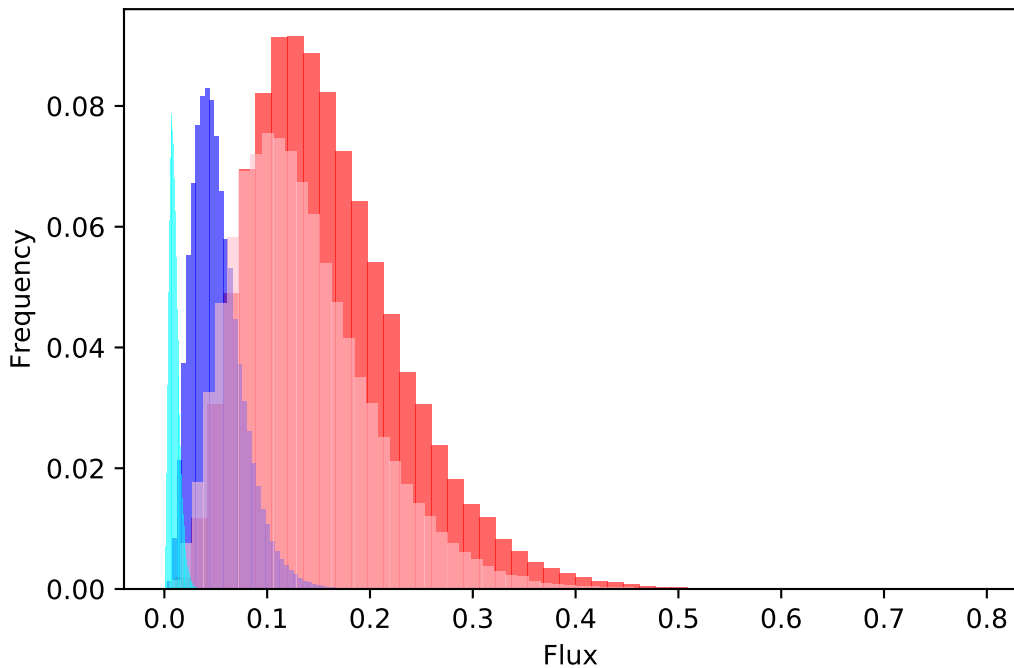
275 : Ind_DASH_GP_h --> GAP_h + Ind_h
['AT3G54640', 'AT4G02610']
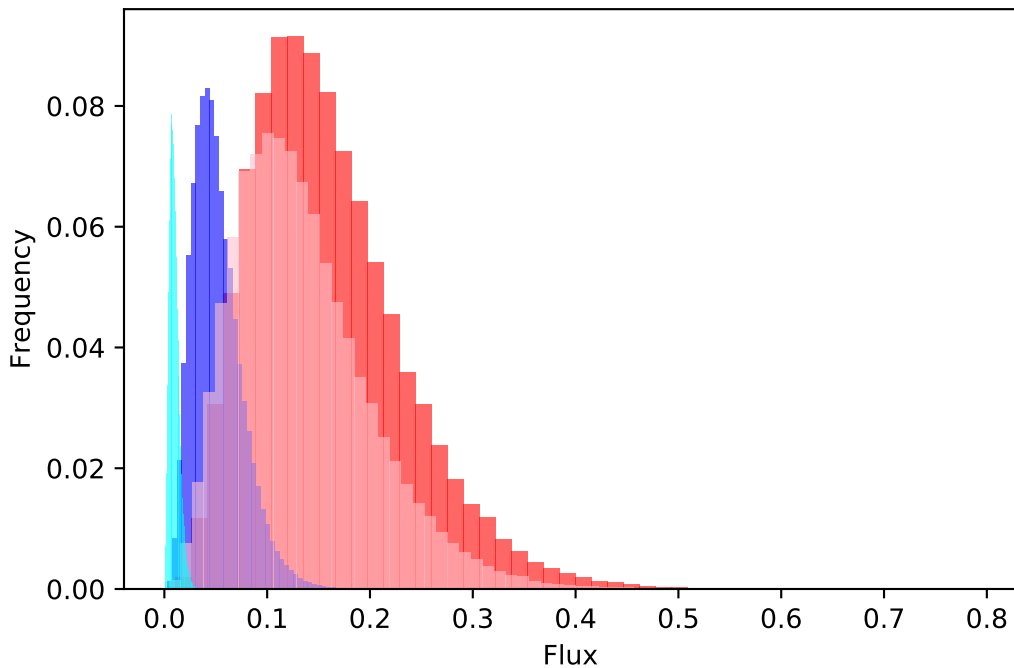
276 : Ind_h + Ser_h --> H2O_h + Trp_h
['AT3G54640', 'AT5G54810', 'AT4G27070']
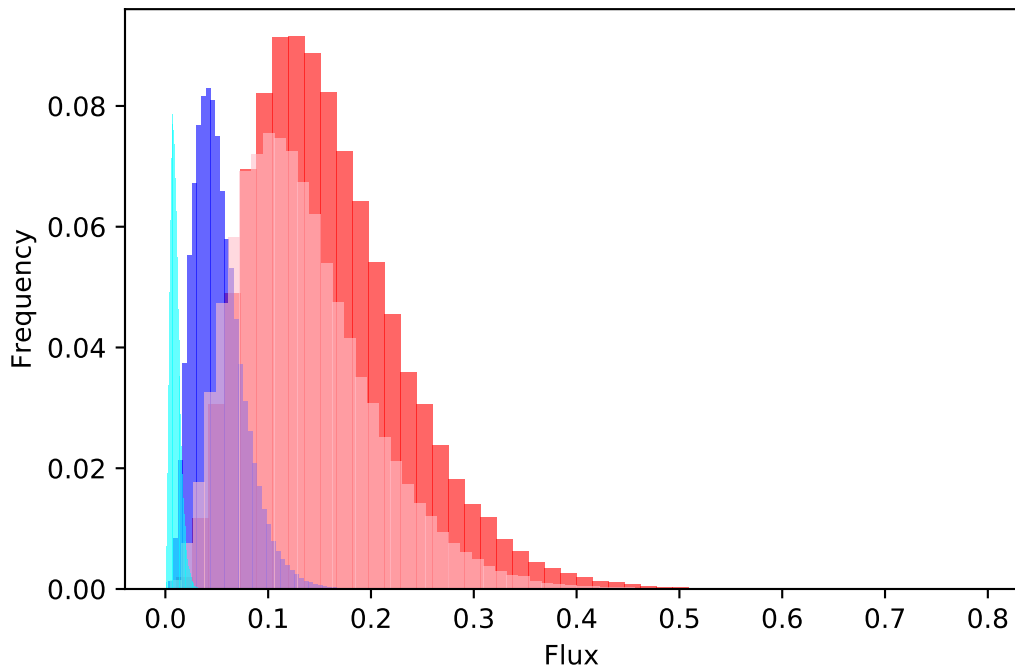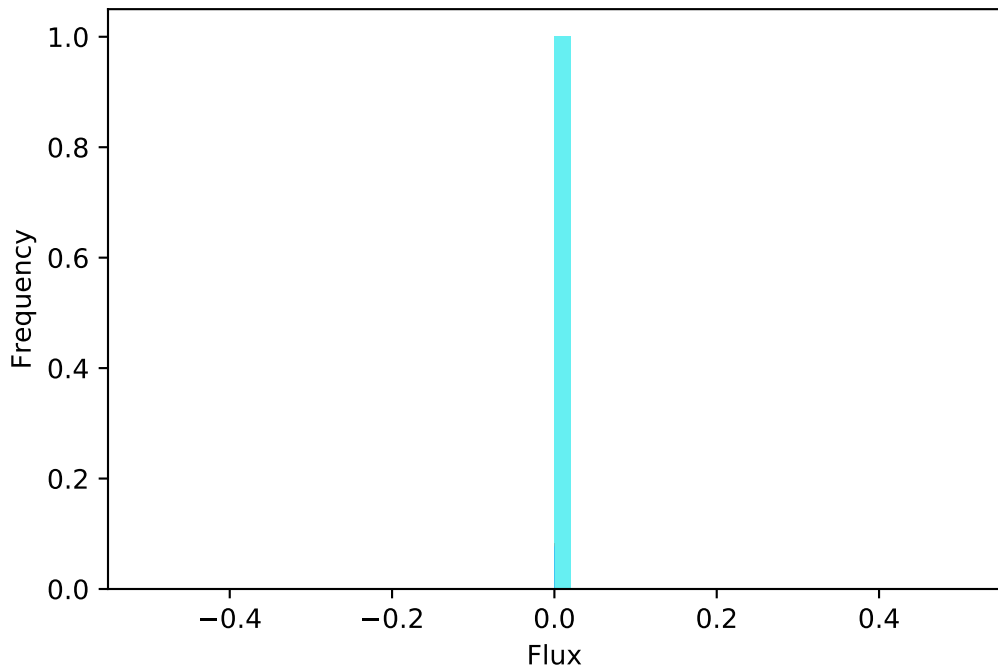
277 : AGN_h + NADP_h --> CO2_h + NADPH_h + Tyr_h
['AT1G15710']
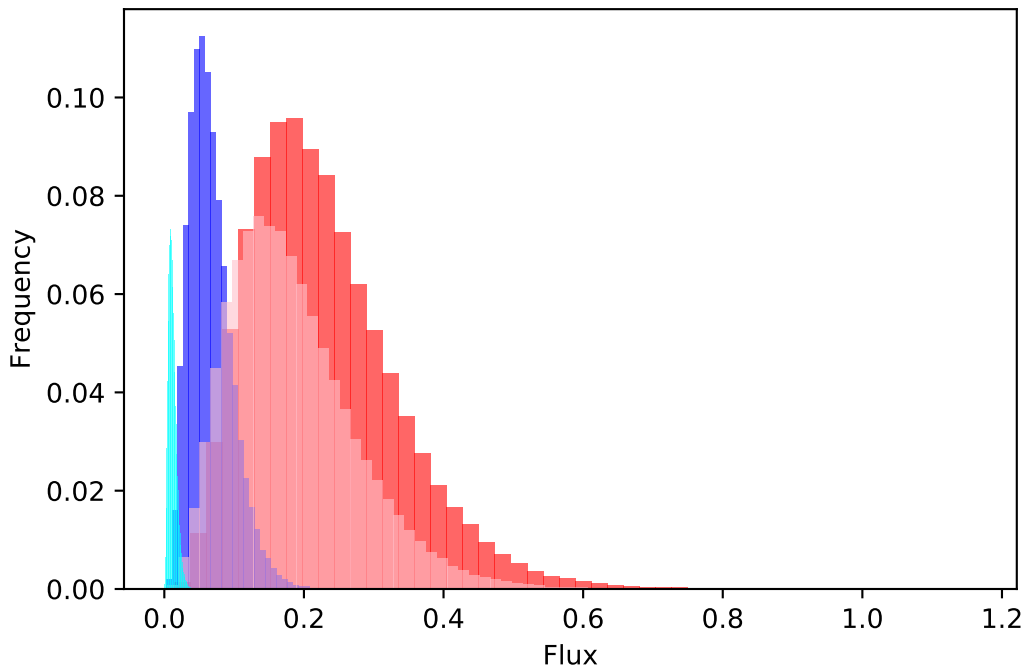
278 : Glu_h + MOB_h <=> KG_h + Val_h
['AT1G10070', 'AT5G65780', 'AT3G49680']
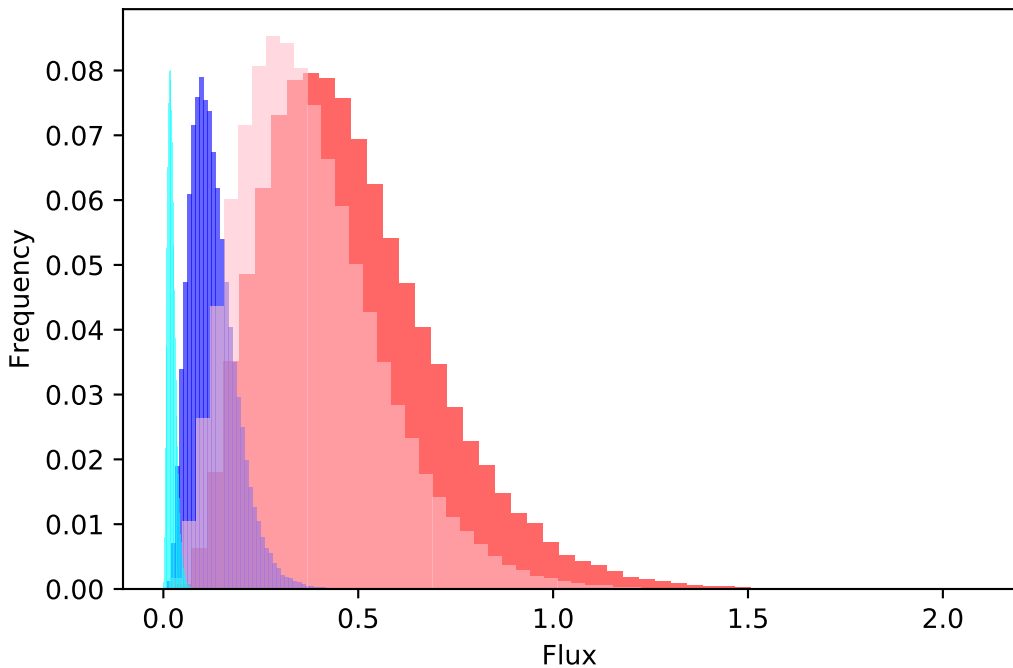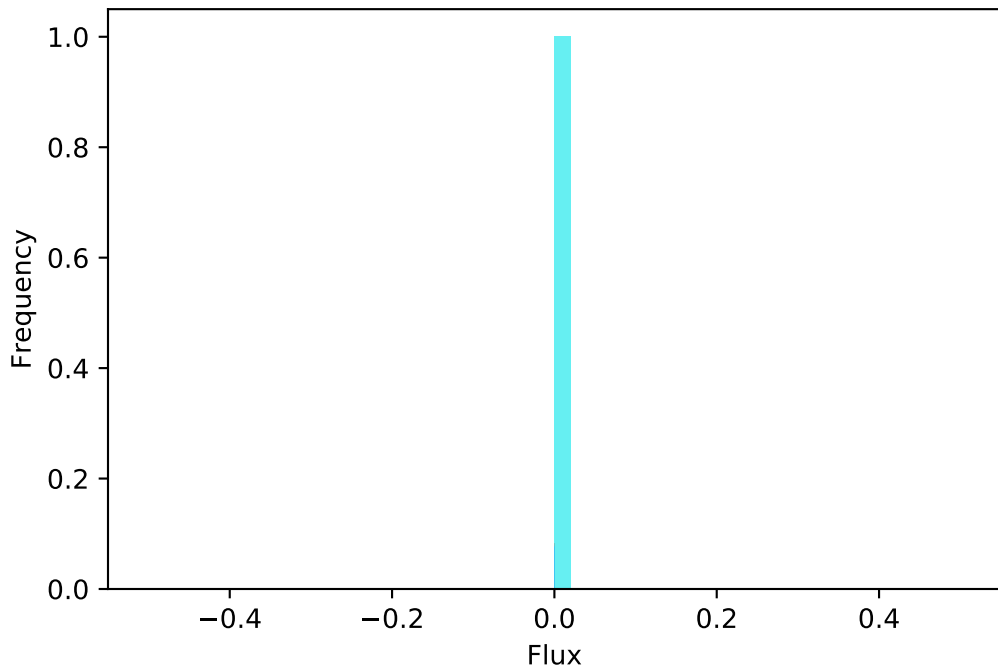
279 : Gln_h + H2O_h + PRPP_h --> Glu_h + H_h + PPi_h + PRA_h
['AT2G16570', 'AT4G34740', 'AT4G38880']
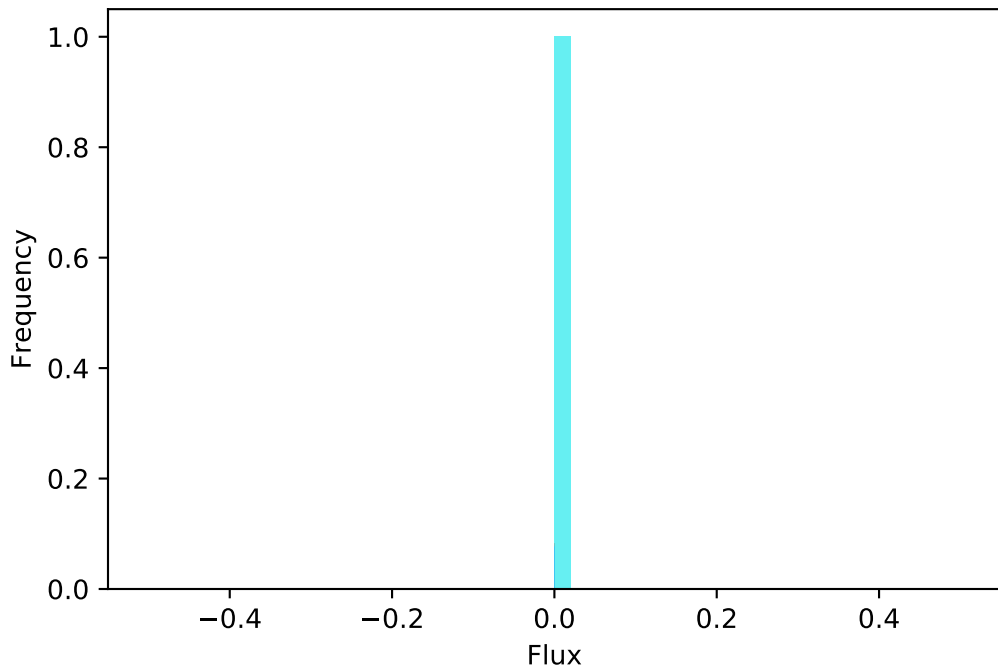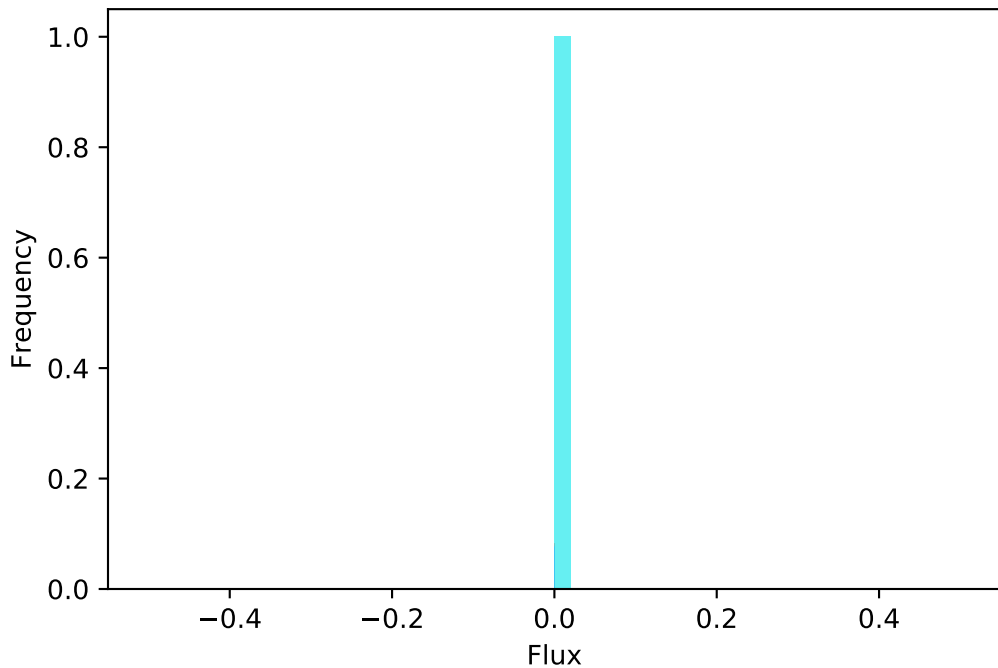
280 : ATP_h + Gly_h + PRA_h --> ADP_h + GAR_h + H_h + Pi_h
['AT1G09830']
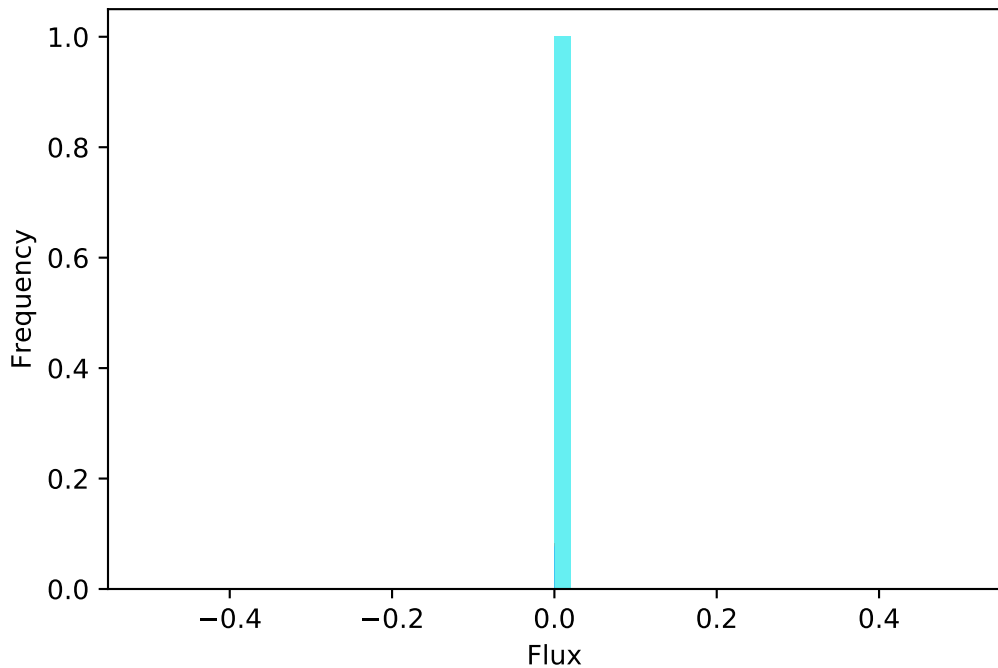
281 : F_DASH_THF_h + GAR_h --> FGAR_h + 2.0 H_h + THF_h
['AT1G31220']
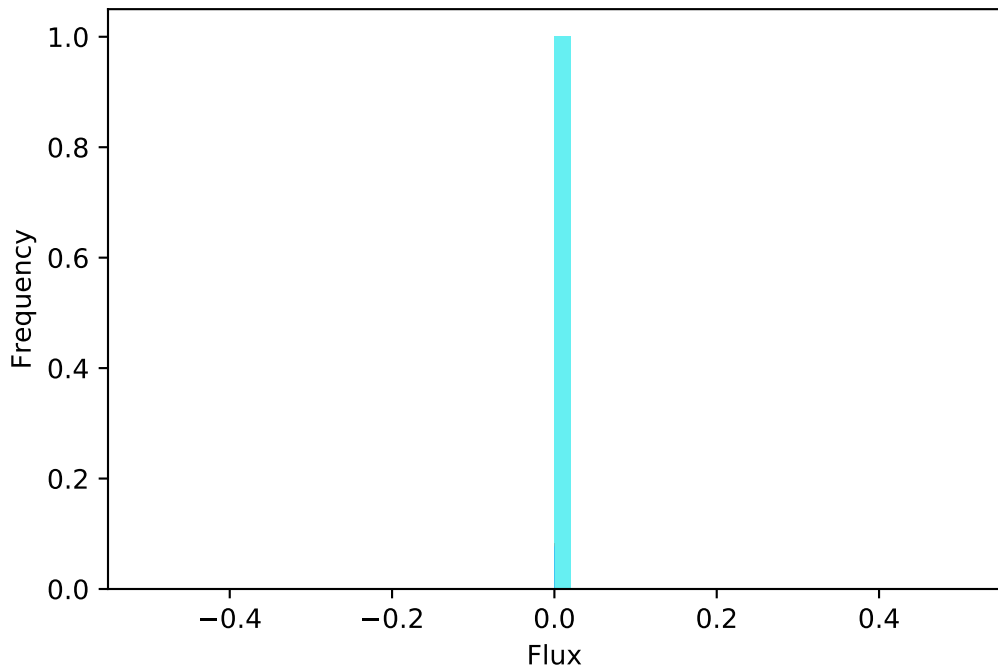
282 : ATP_h + FGAR_h + Gln_h + H2O_h --> ADP_h + FGAM_h + Glu_h + 2.0 H_h + Pi_h
['AT1G74260']

283 : ATP_h + FGAM_h --> ADP_h + AIR_h + H_h + Pi_h
['AT3G55010']
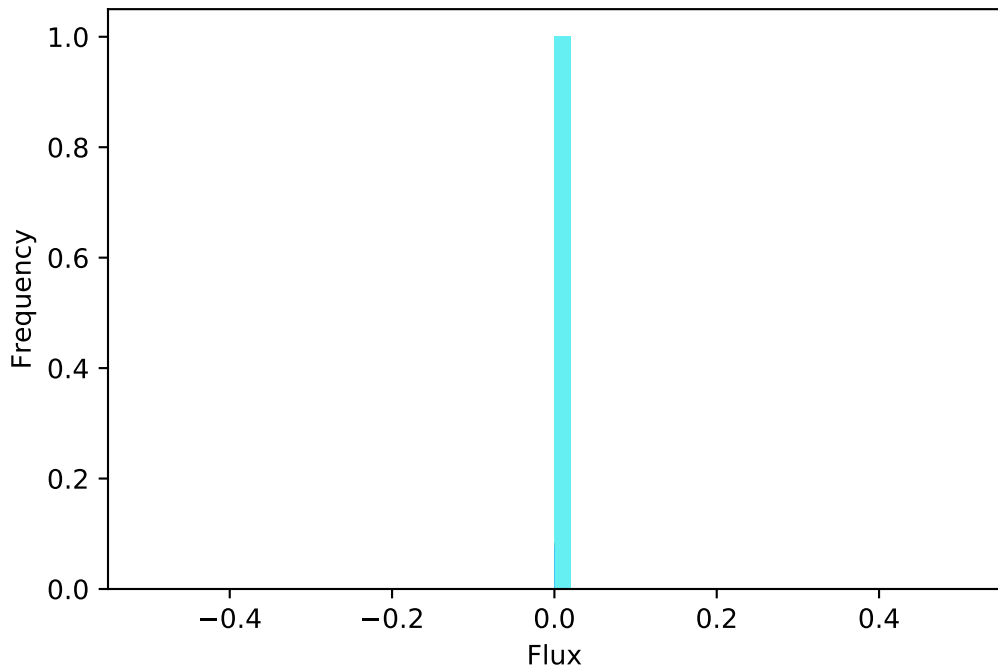
284 : AIR_h + CO2_h --> CAIR_h + H_h
['AT2G37690']

285 : ATP_h + Asp_h + CAIR_h --> ADP_h + H_h + Pi_h + SAICAR_h
['AT3G21110']
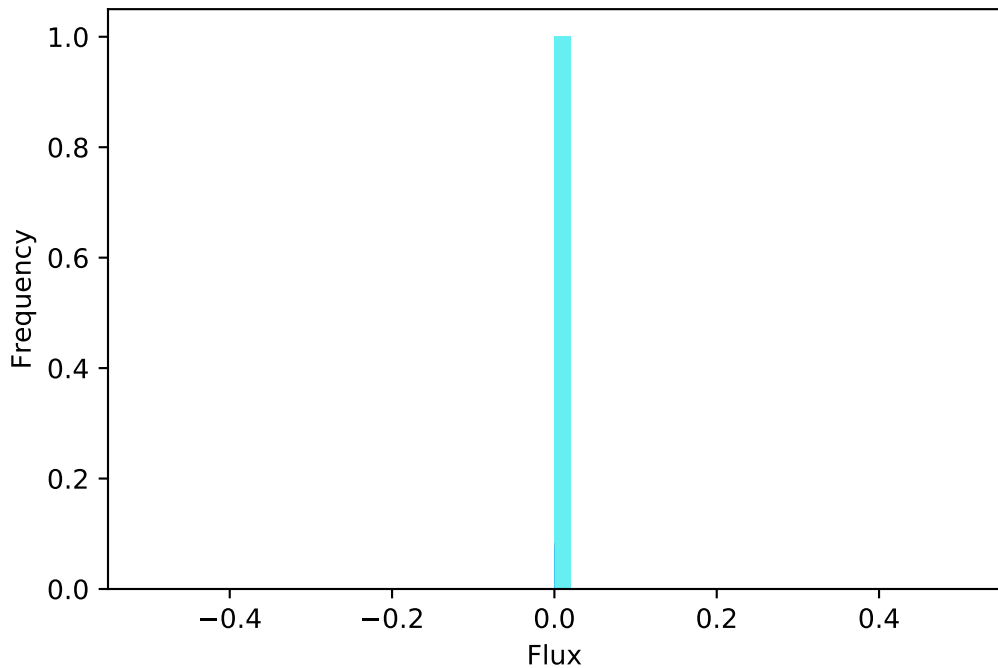
286 : H_h + SAICAR_h --> AICAR_h + Fum_h
['AT4G18440', 'AT1G36280']

287 : AICAR_h + F_DASH_THF_h --> FAICAR_h + 2.0 H_h + THF_h
['AT2G35040']
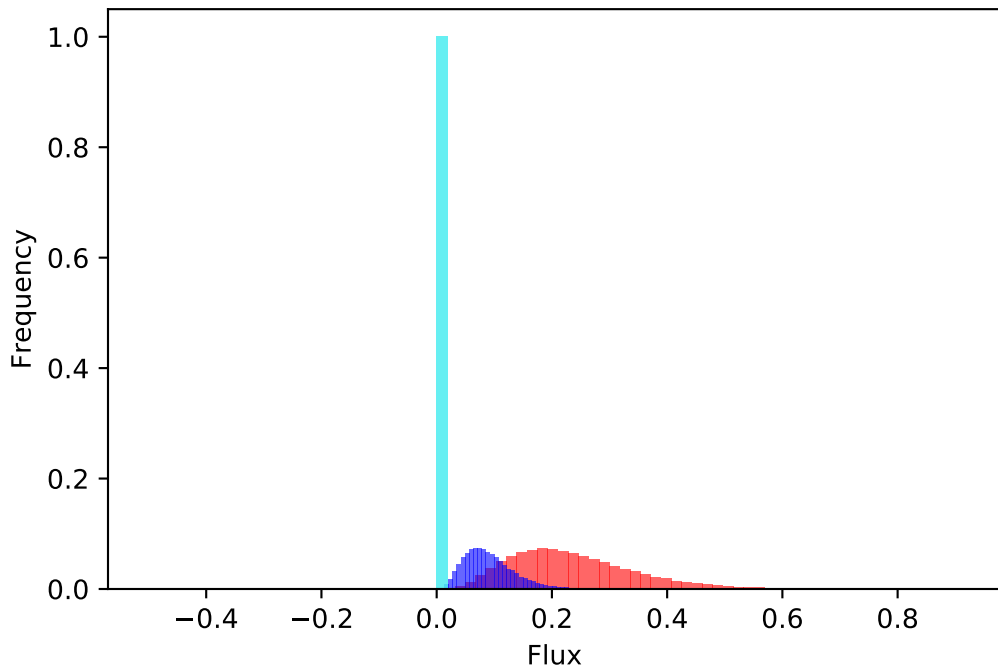
288 : FAICAR_h --> H2O_h + IMP_h
['AT2G35040']
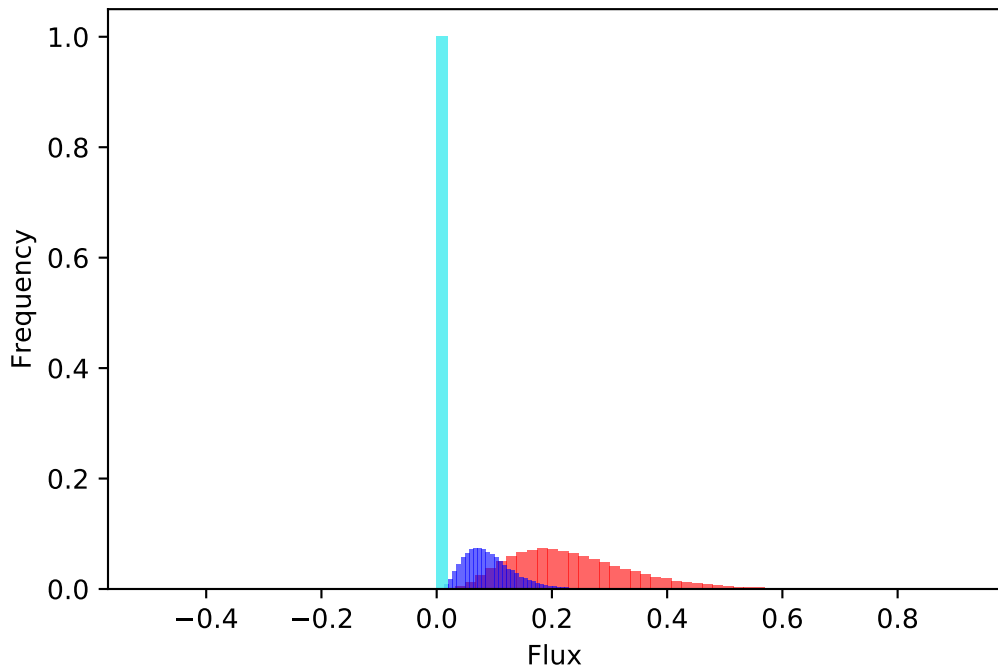
289 : AMP_c + H2O_c + H_c --> IMP_c + NH4_c
['2*AT2G38280']

290 : H2O_c + IMP_c + NAD_c --> NADH_c + XMP_c
['AT1G79470', 'AT1G16350']

291 : ATP_c + Gln_c + H2O_c + XMP_c --> AMP_c + GMP_c + Glu_c + H_c + PPi_c
['AT1G63660']

292 : Asp_h + GTP_h + IMP_h --> DC_DASH_AMP_h + GDP_h + H_h + Pi_h
['2*AT3G57610']
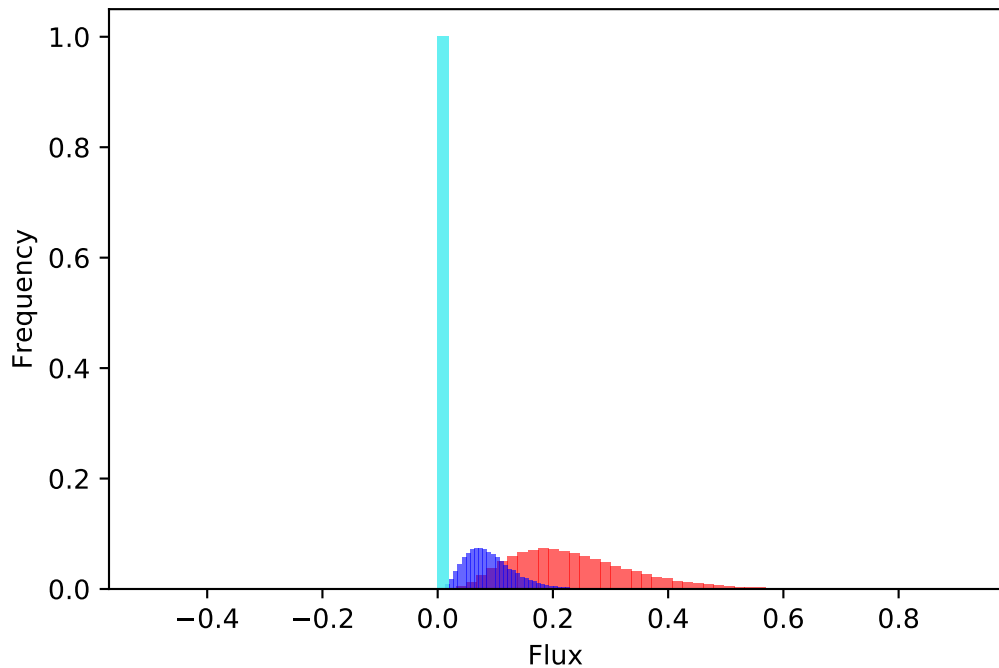
293 : DC_DASH_AMP_h --> AMP_h + Fum_h
['AT4G18440', 'AT1G36280']
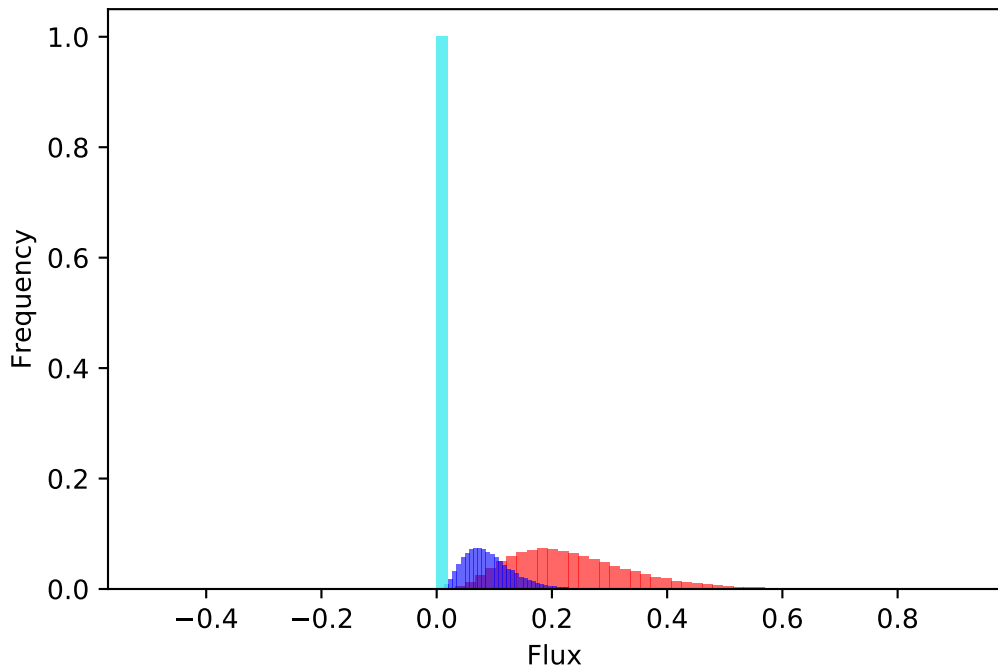
294 : Asp_h + CBP_h --> CB_DASH_Asp_h + Pi_h
['AT3G20330']
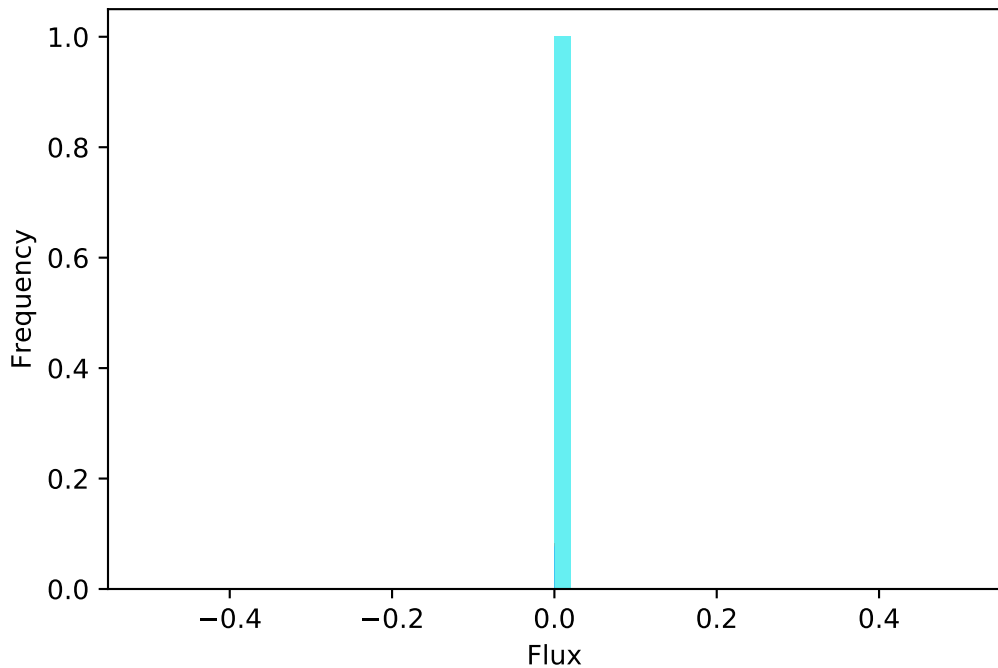
295 : CB_DASH_Asp_h --> DHO_h + H2O_h
['AT4G22930']

296 : DHO_m + H_m + Q_m --> QH2_m + orO_m
['AT5G23300']

297 : PRPP_c + orO_c --> H_c + OMP_c + PPi_c
['AT3G54470']
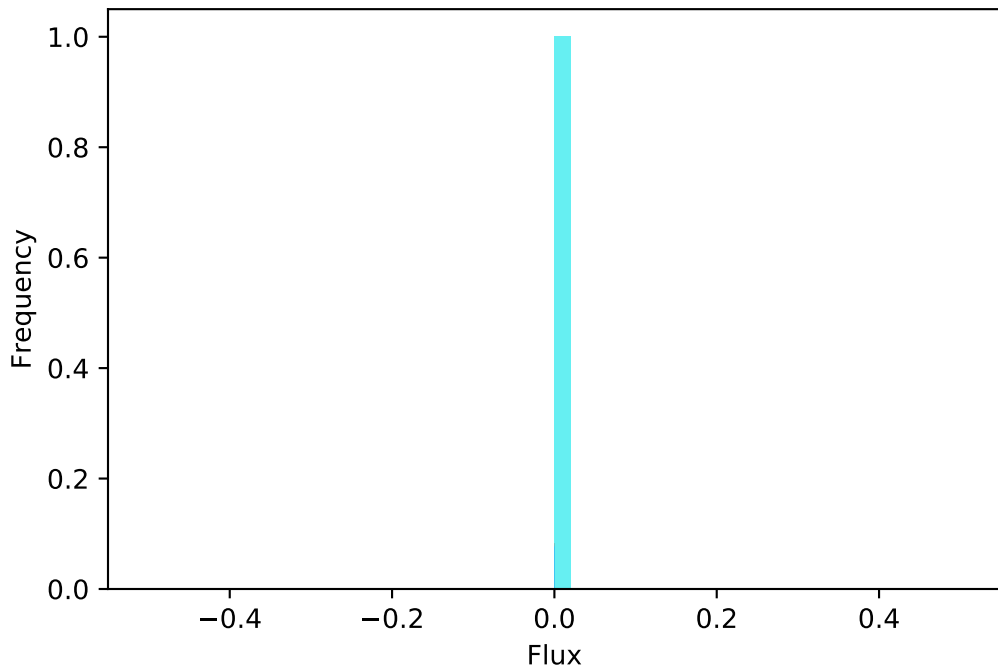
298 : H_c + OMP_c --> CO2_c + UMP_c
['AT3G54470']

299 : ATP_c + Gln_c + H2O_c + UTP_c --> ADP_c + CTP_c + Glu_c + 2.0 H_c + Pi_c
['AT1G30820', 'AT4G20320', 'AT2G34890', 'AT3G12670', 'AT4G02120']
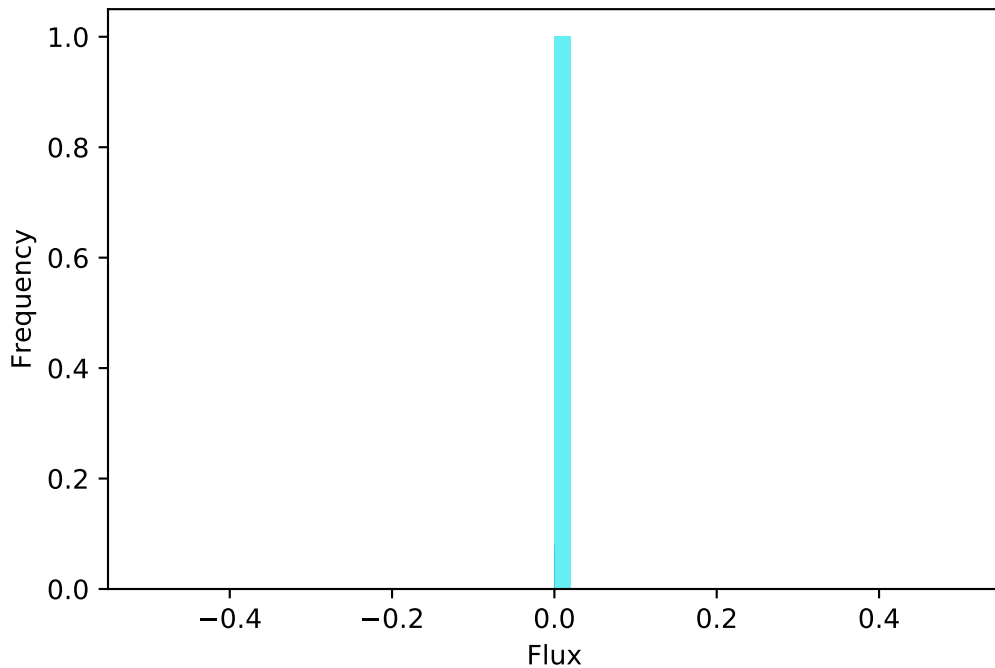
300 : AMP_c + ATP_c --> 2.0 ADP_c
['AT2G37250', 'AT5G63400', 'AT5G50370']
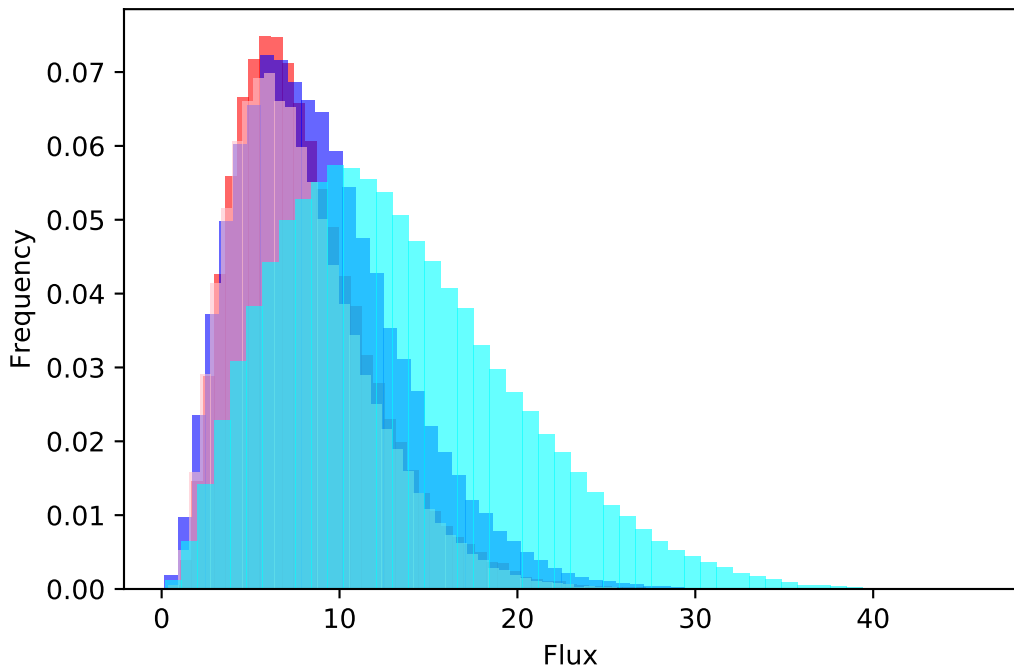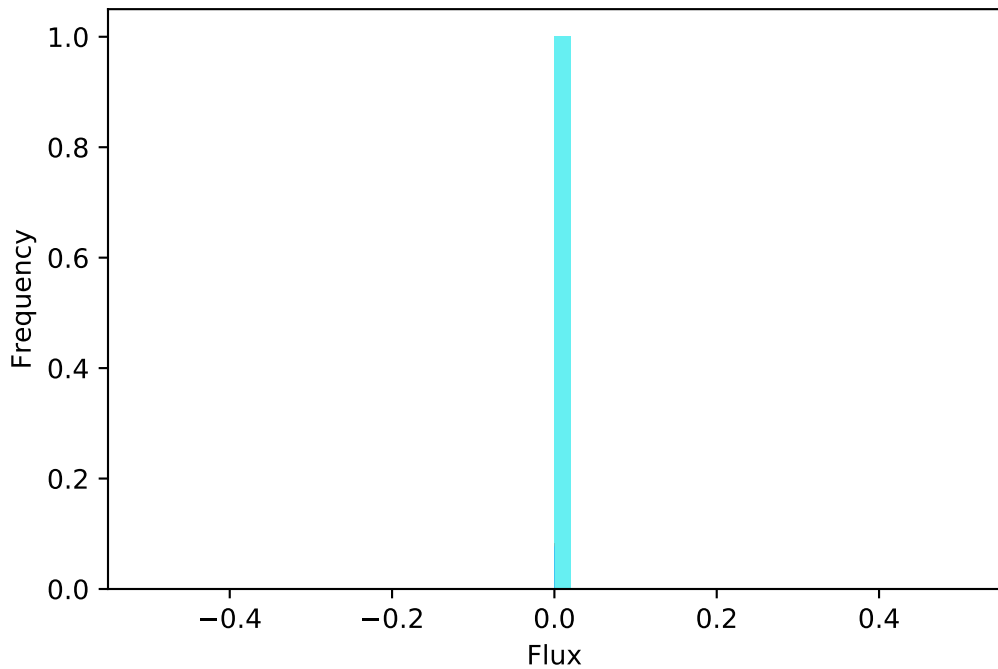
301 : AMP_h + ATP_h --> 2.0 ADP_h
['AT2G37250', 'AT5G35170', 'AT5G47840']
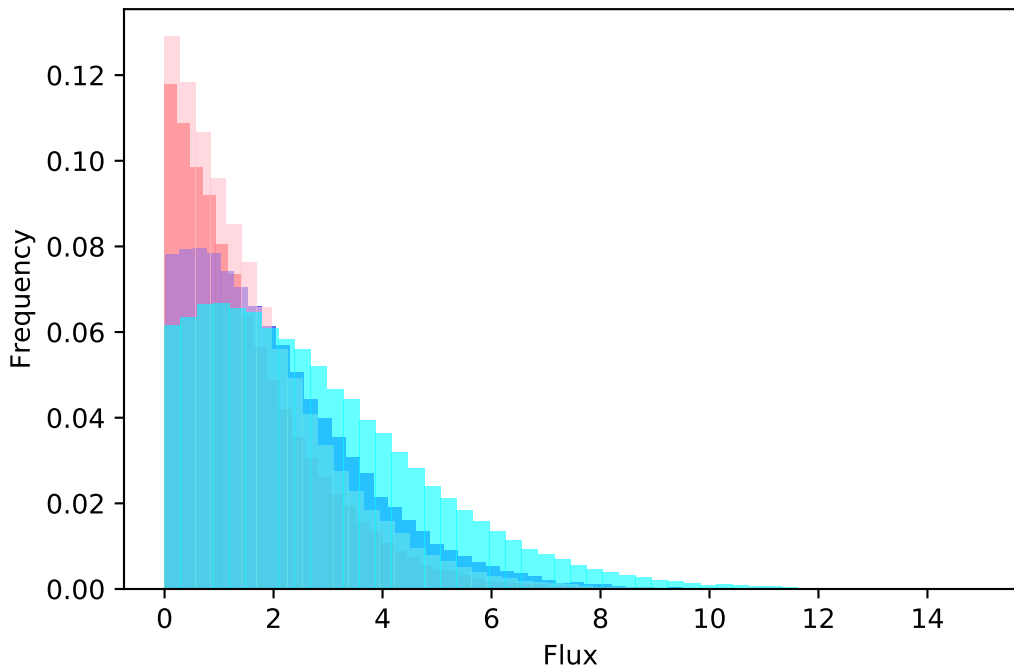
302 : ATP_c + GMP_c + H_c --> ADP_c + GDP_c
['AT3G57550', 'AT2G41880']
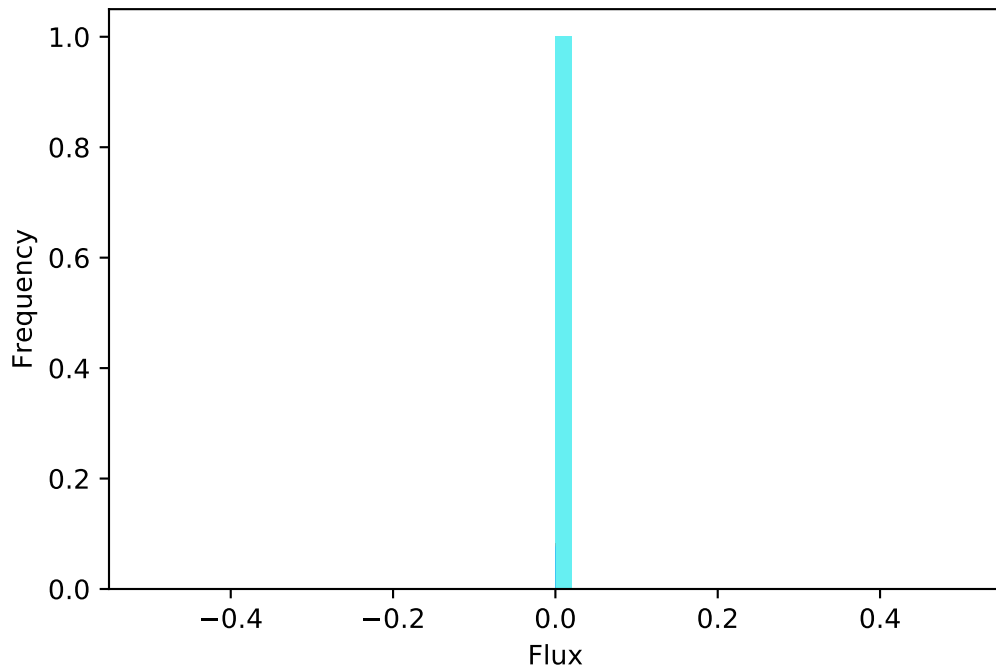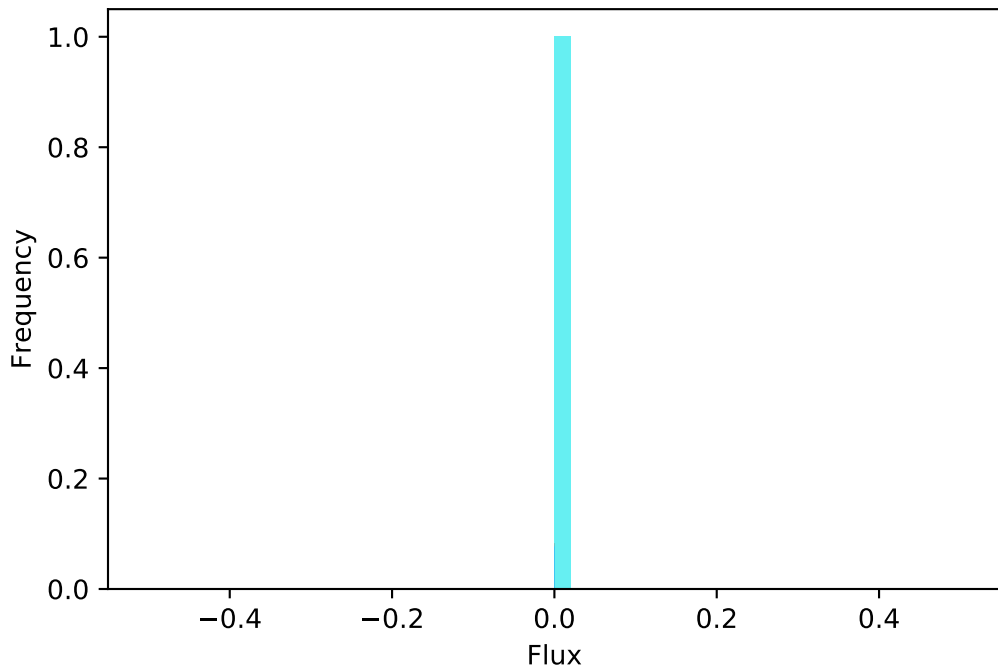
303 : ATP_c + H_c + UMP_c --> ADP_c + UDP_c
['AT5G26667']

304 : CTP_c + H2O_c --> CDP_c + Pi_c
['AT3G04080']

305 : ADP_c + H_c + TRXrd_c --> H2O_c + TRXox_c + dADP_c
['2*AT2G21790', 'AT3G27060', '2*AT3G23580']
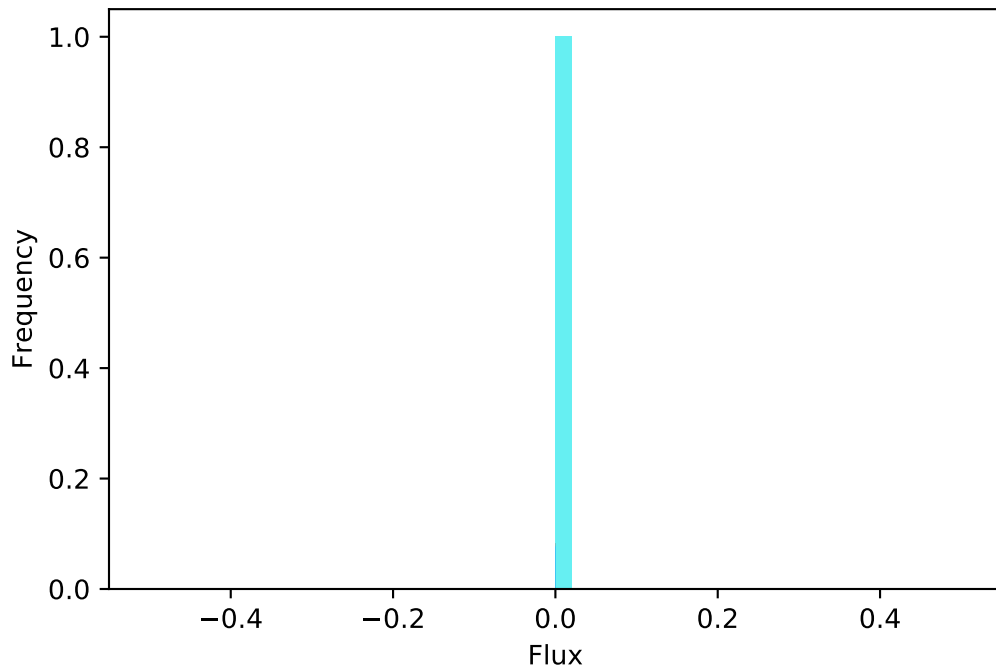
306 : CDP_c + TRXrd_c --> H2O_c + TRXox_c + dCDP_c
['2*AT2G21790', 'AT3G27060', '2*AT3G23580']

307 : GDP_c + TRXrd_c --> H2O_c + TRXox_c + dGDP_c
['2*AT2G21790', 'AT3G27060', '2*AT3G23580']

308 : TRXrd_c + UDP_c --> H2O_c + TRXox_c + dUDP_c
['2*AT2G21790', 'AT3G27060', '2*AT3G23580']

309 : H2O_c + dUTP_c --> 2.0 H_c + PPi_c + dUMP_c
['3*AT3G46940']
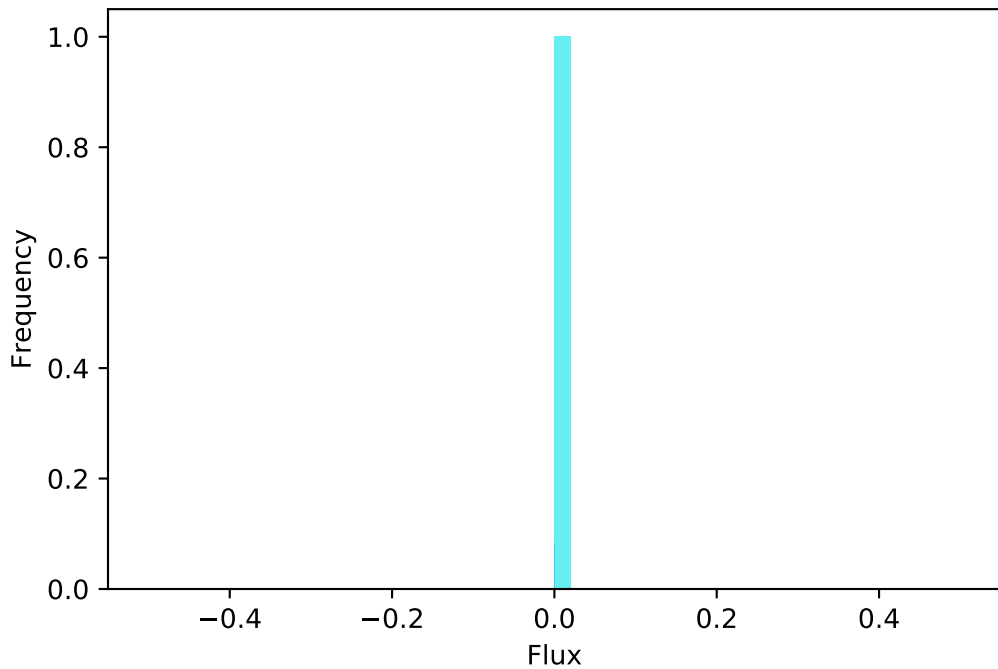
310 : M_DASH_THF_c + dUMP_c --> DHF_c + dTMP_c
['AT2G21550', 'AT2G16370']

311 : ATP_c + H_c + dTMP_c --> ADP_c + dTDP_c
['AT5G59440']

312 : ATP_c + GDP_c --> ADP_c + GTP_c + H_c
['AT5G63310', '6*AT4G09320']

313 : ATP_h + GDP_h --> ADP_h + GTP_h + H_h
['AT5G63310', '6*AT4G09320']
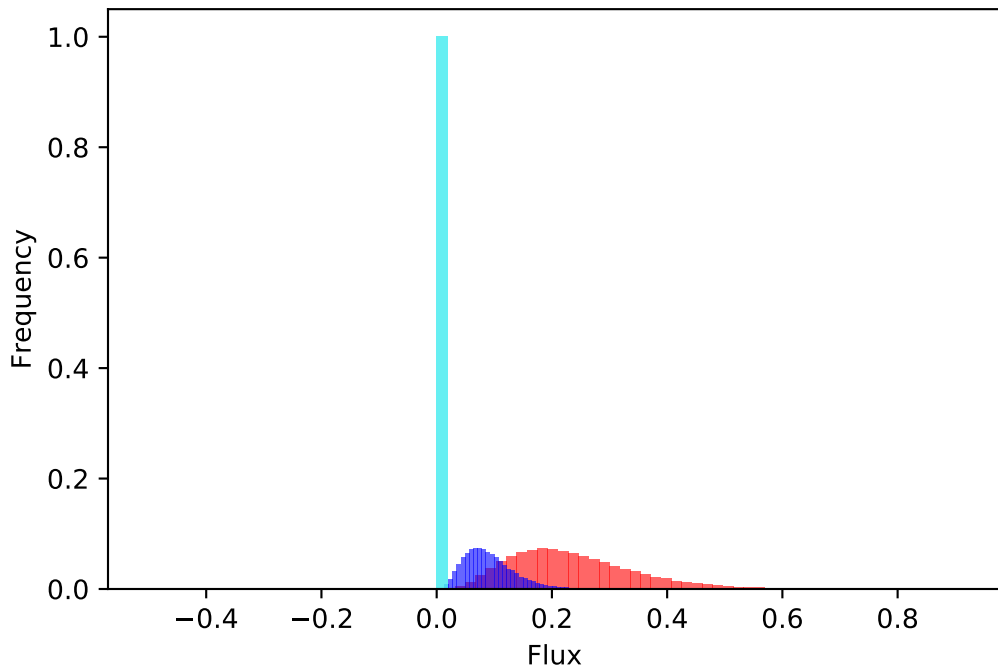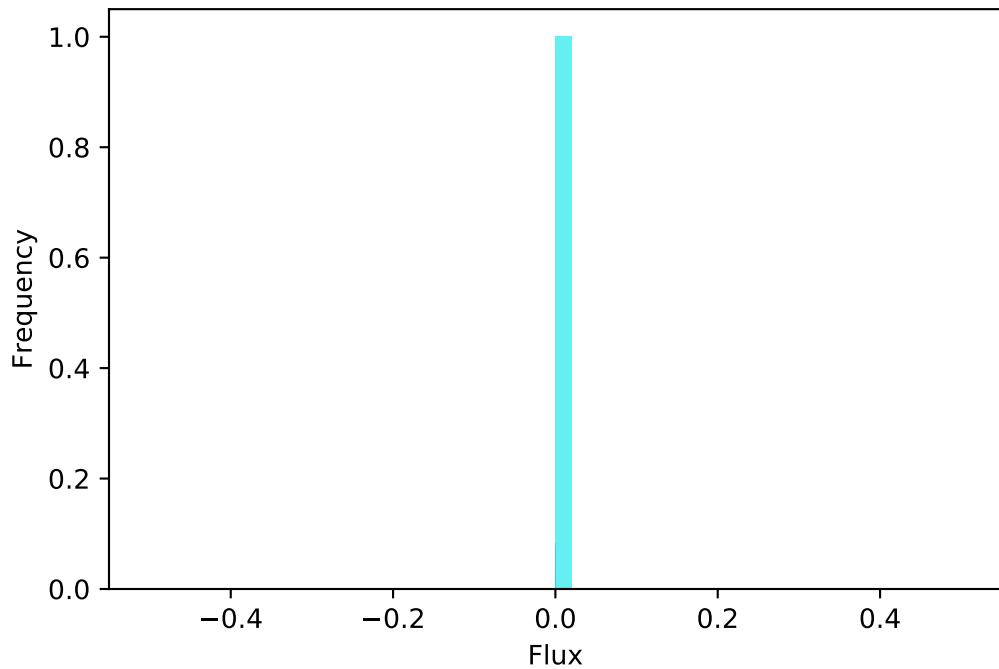
314 : ATP_c + UDP_c --> ADP_c + H_c + UTP_c
['AT5G63310', '6*AT4G09320']
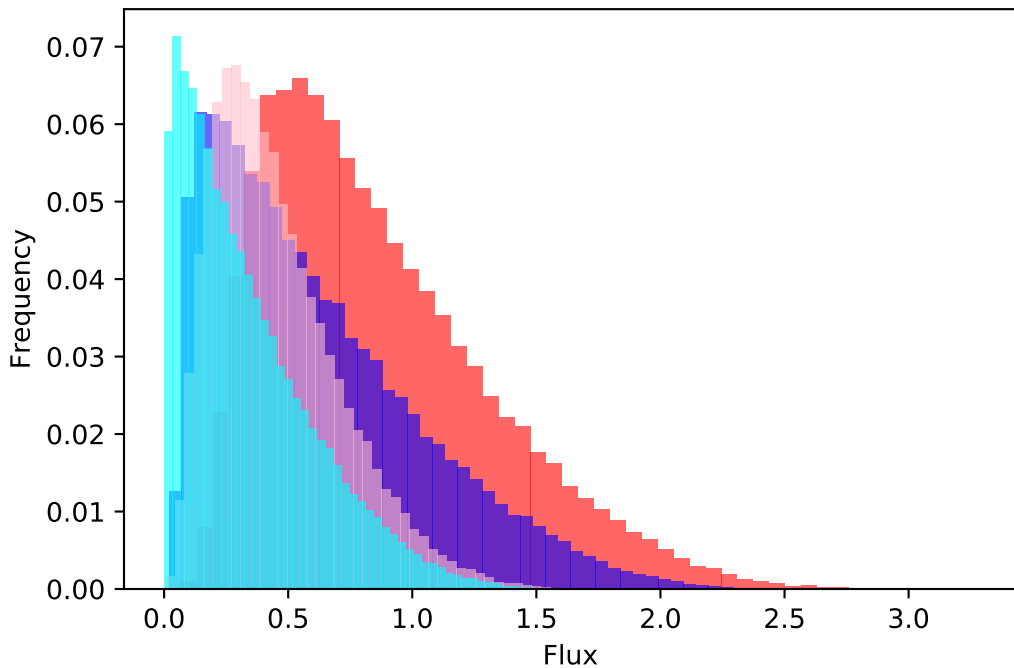
315 : ATP_c + dADP_c --> ADP_c + dATP_c
['AT5G63310', '6*AT4G09320']
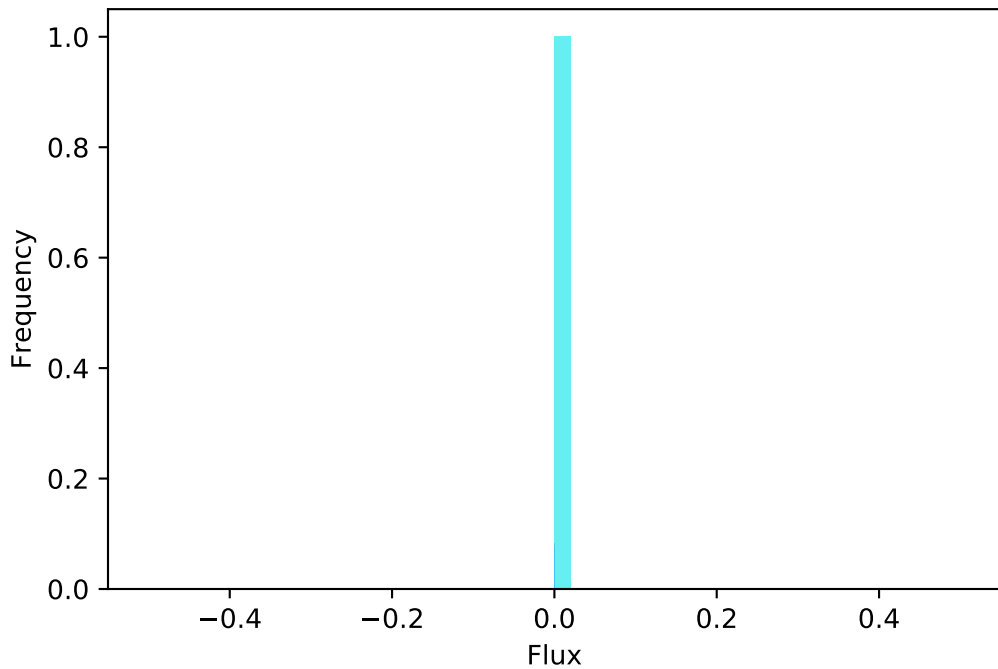
316 : ATP_c + dCDP_c --> ADP_c + dCTP_c
['AT5G63310', '6*AT4G09320']

317 : ATP_c + dGDP_c --> ADP_c + dGTP_c
['AT5G63310', '6*AT4G09320']
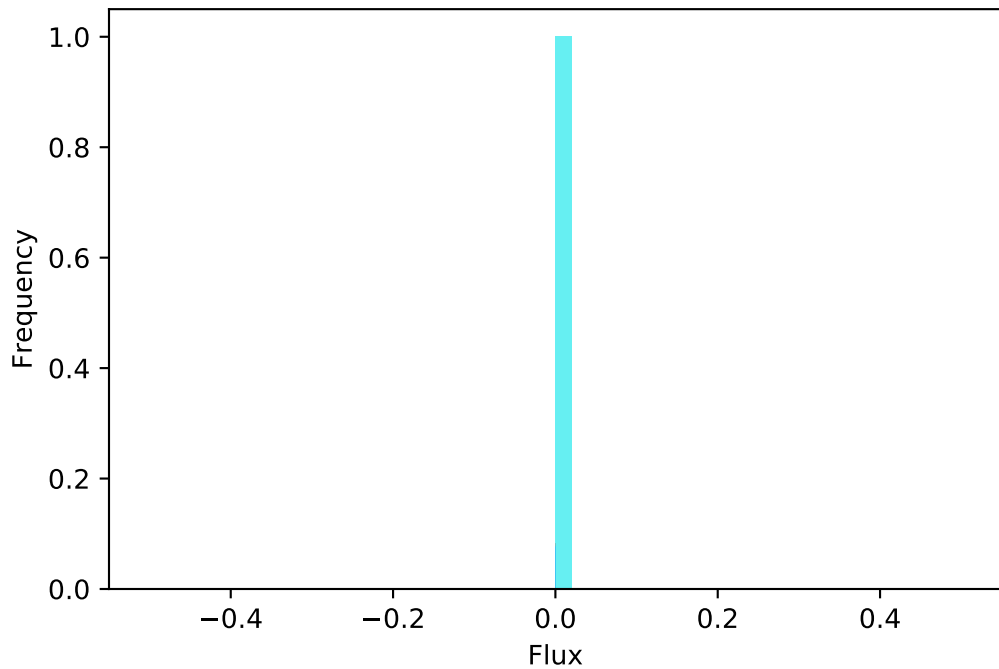
318 : ATP_c + dTDP_c --> ADP_c + dTTP_c
['AT5G63310', '6*AT4G09320']

319 : ATP_c + dUDP_c --> ADP_c + dUTP_c
['AT5G63310', '6*AT4G09320']

320 : SO4_c <=> SO4_h
['-']

321 : NO2_c --> NO2_h
['-']

322 : ADP_h + ATP_c + Pi_h --> ADP_c + ATP_h + Pi_c
['-']

323 : ADP_c + ATP_m + Pi_c --> ADP_m + ATP_c + Pi_m
['-']
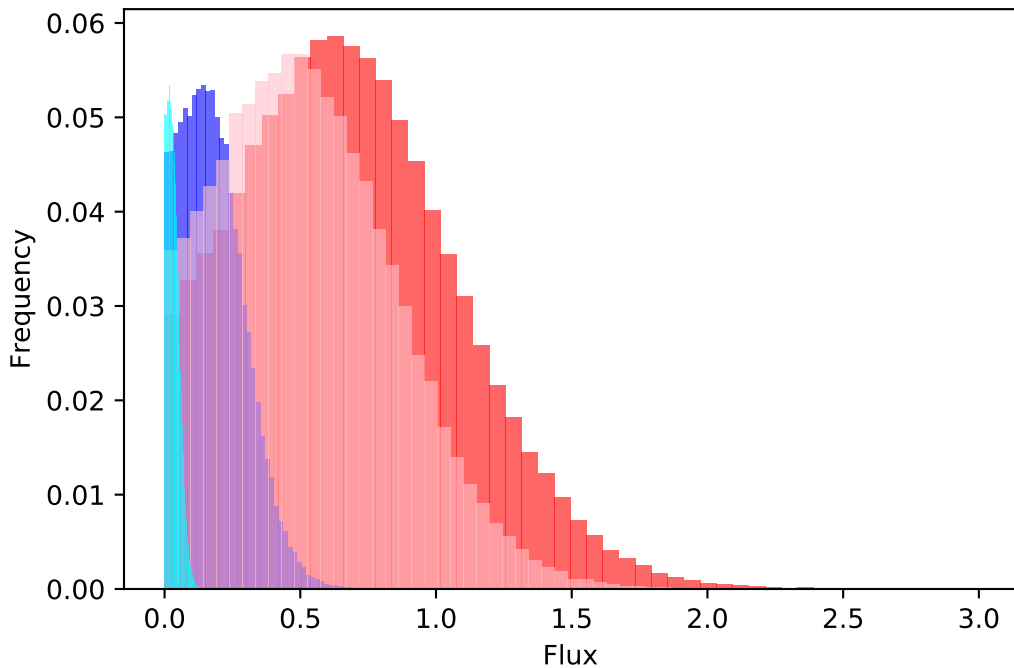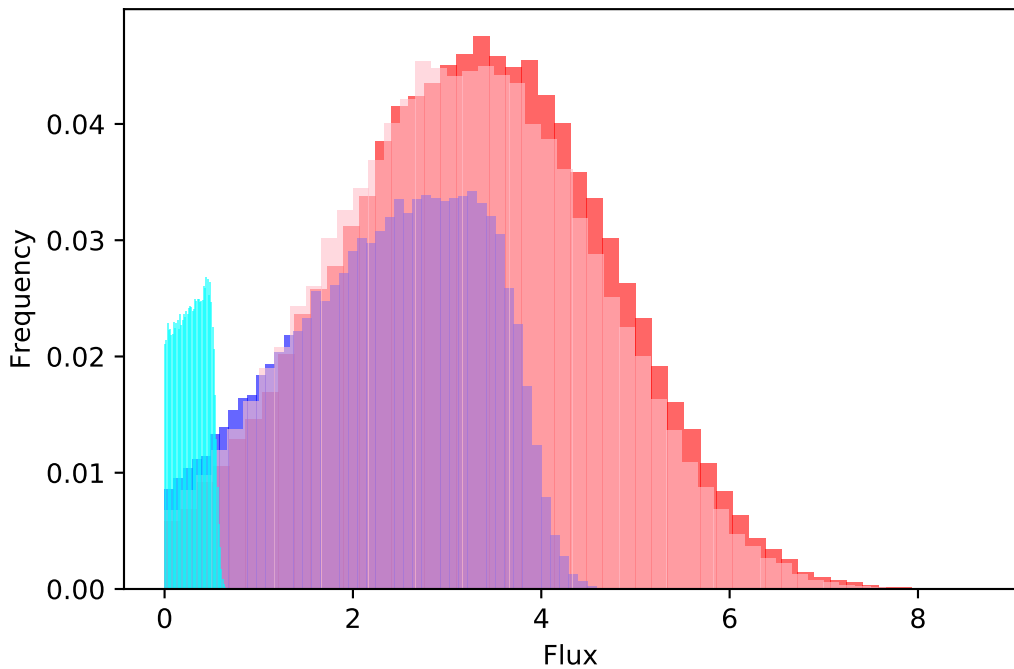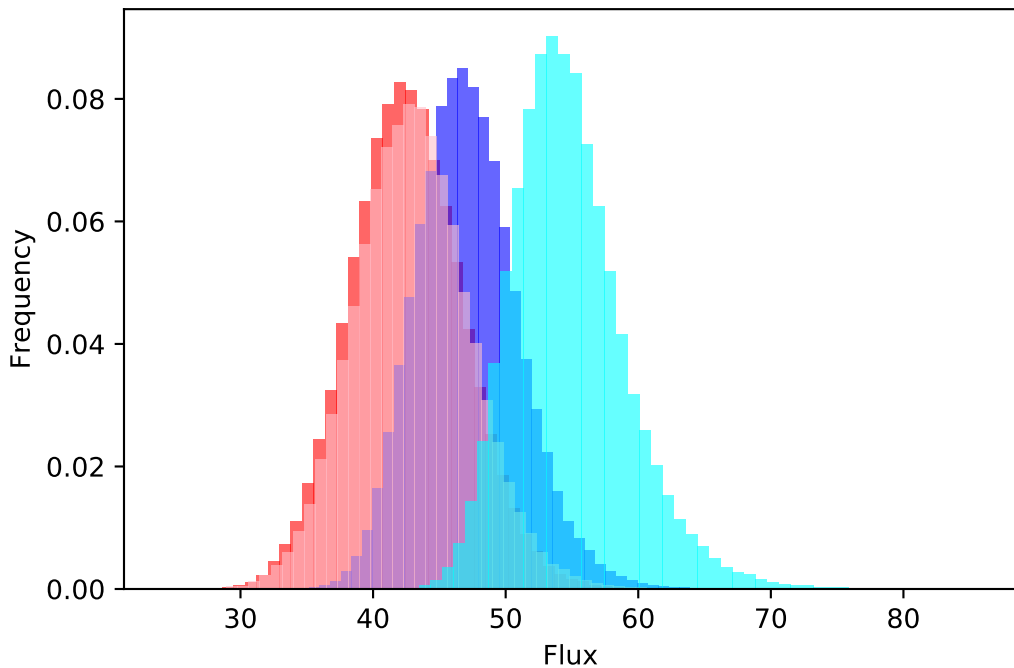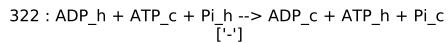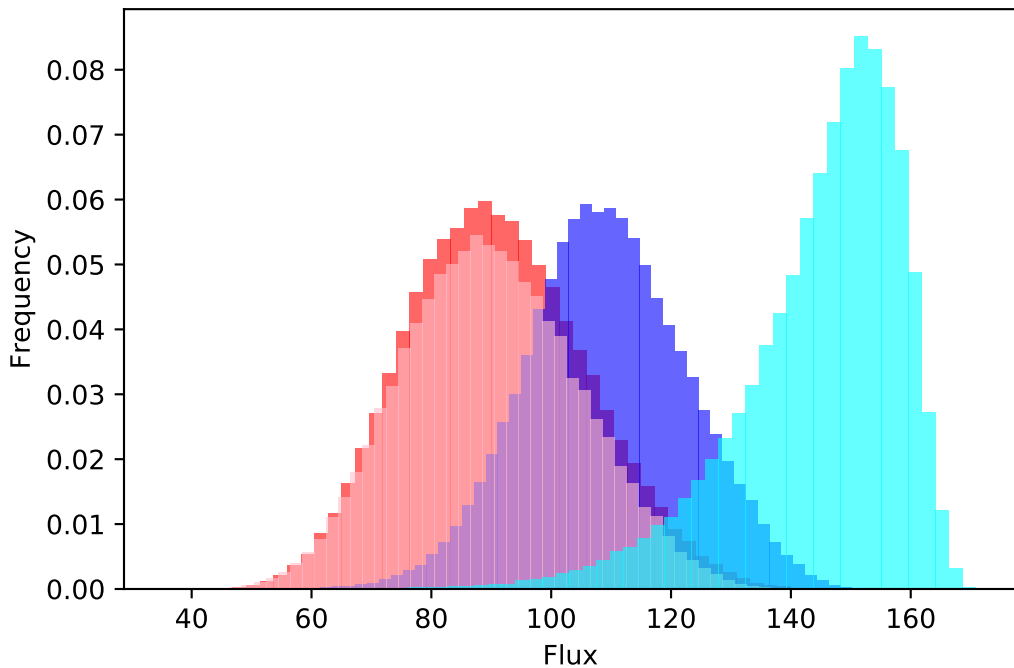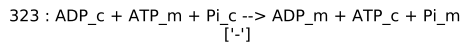
324 : AMP_h --> AMP_c
['-']
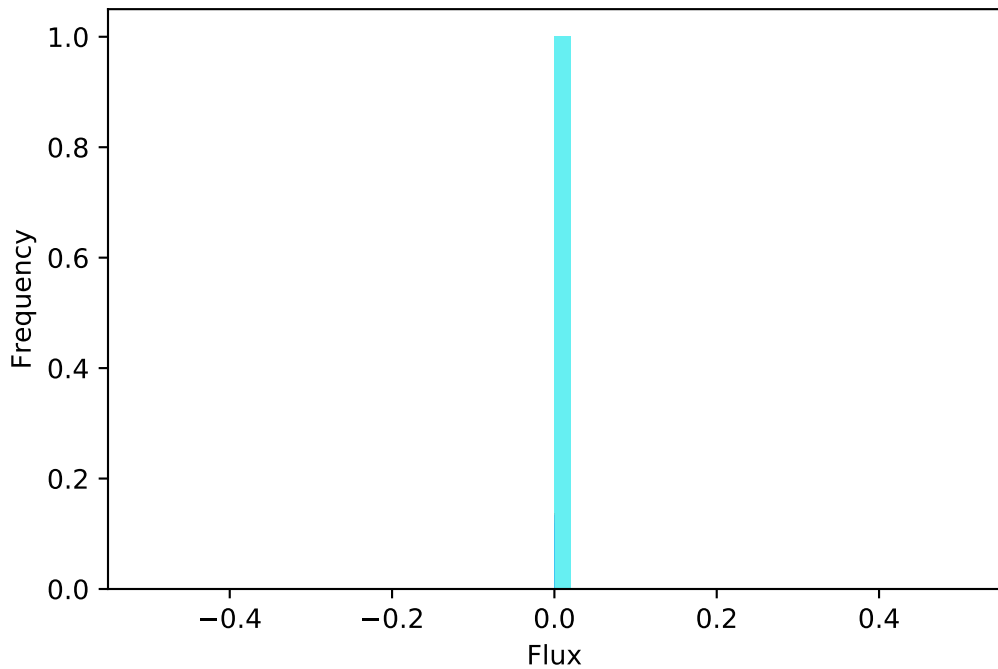
325 : ADP_h --> ADP_c
['-']
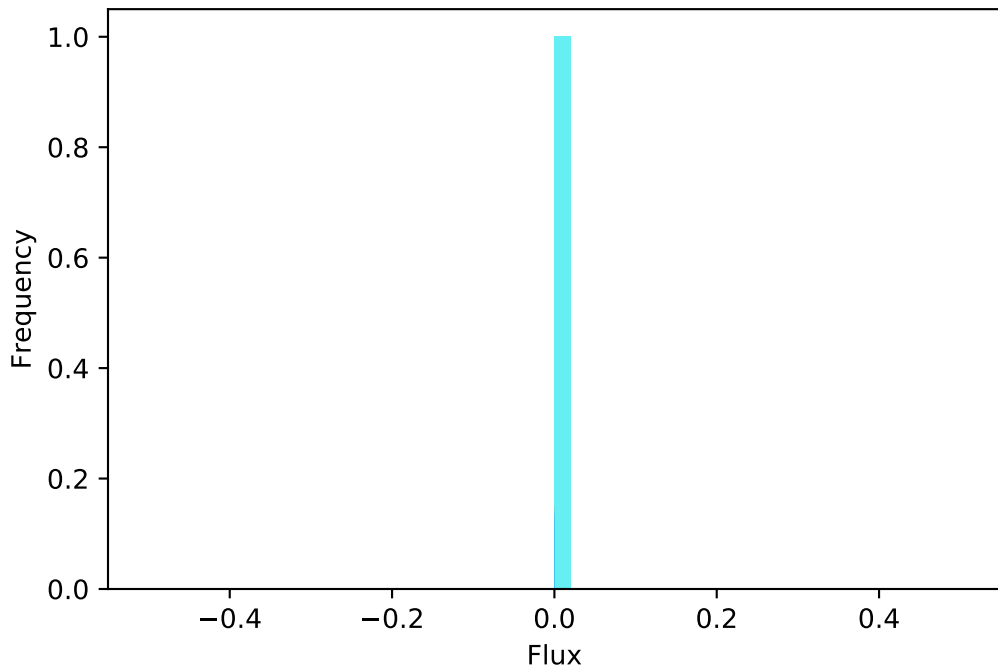
326 : ATP_h --> ATP_c
['-']
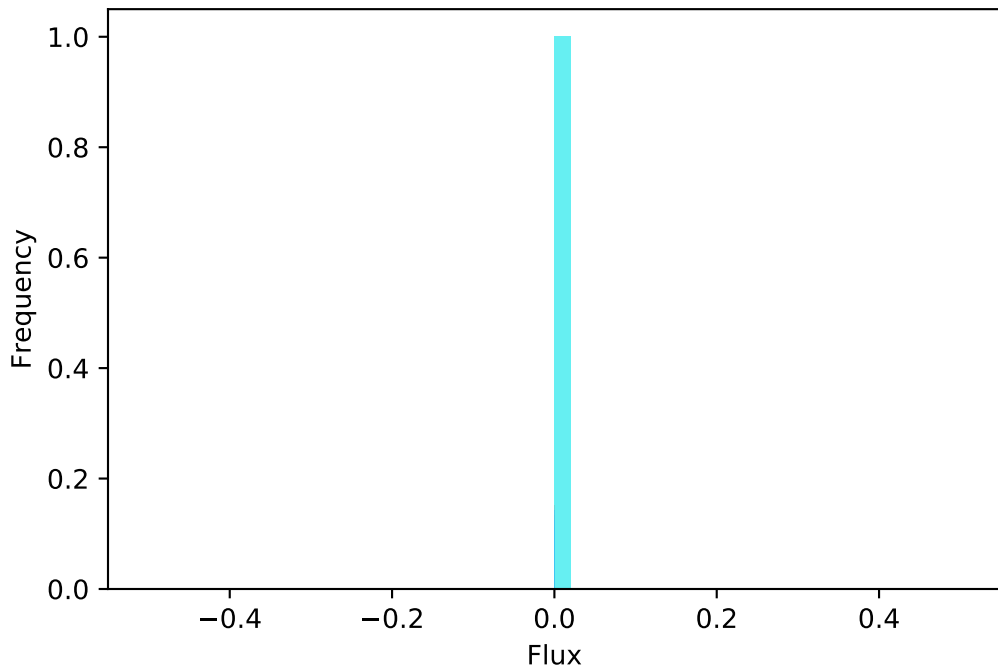
327 : AMP_h + NAD_c <=> AMP_c + NAD_h
['-']
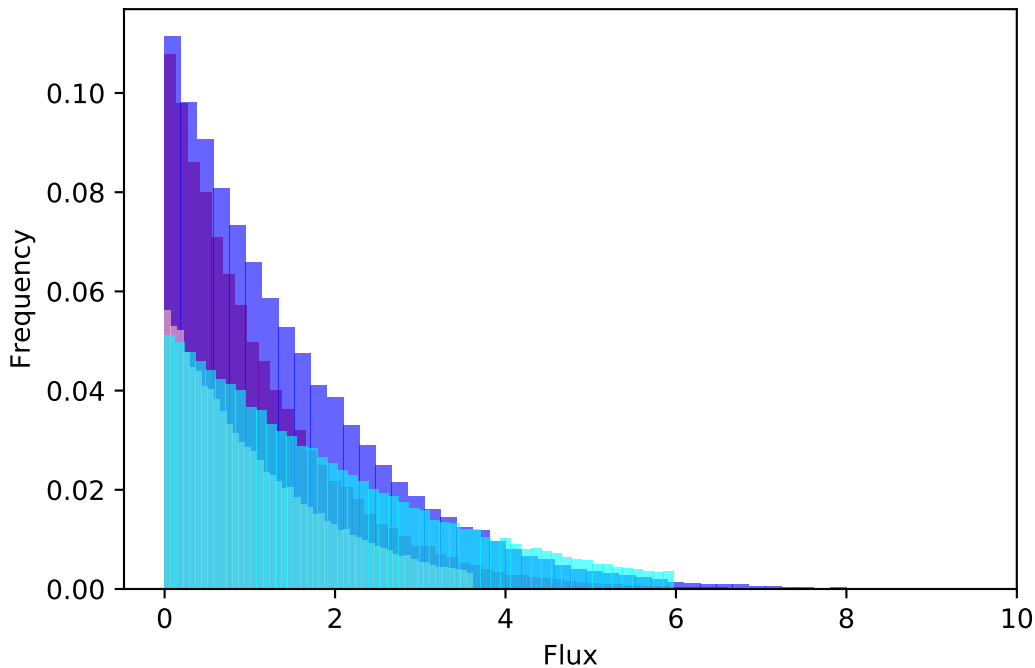
328 : ADP_h + NAD_c <=> ADP_c + NAD_h
['-']
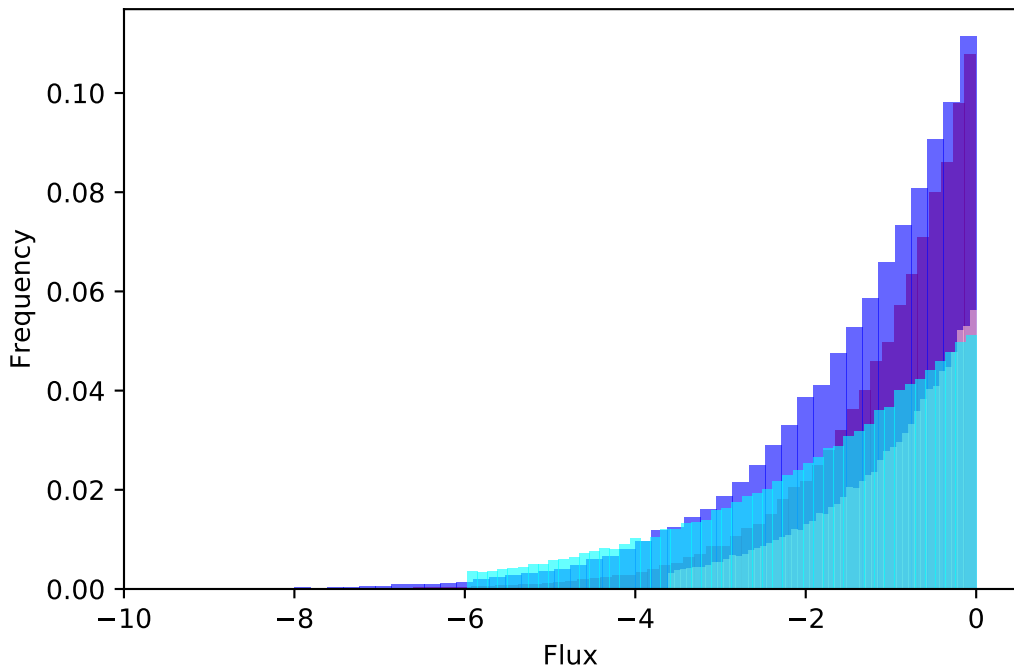
329 : PGA_h + Pi_c <=> PGA_c + Pi_h
['-']
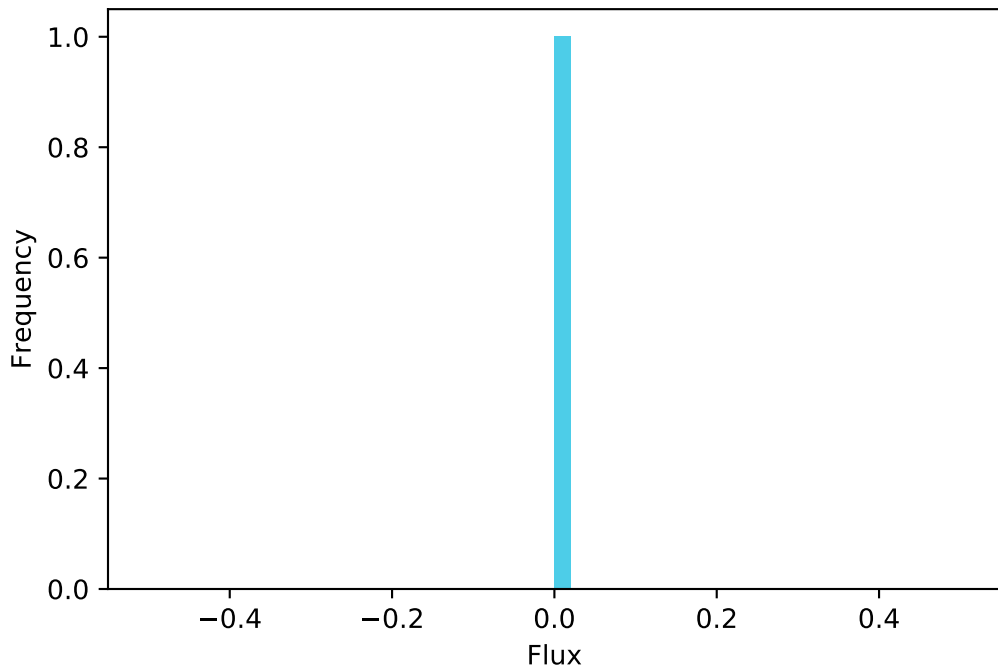
330 : GAP_h + Pi_c <=> GAP_c + Pi_h
['-']
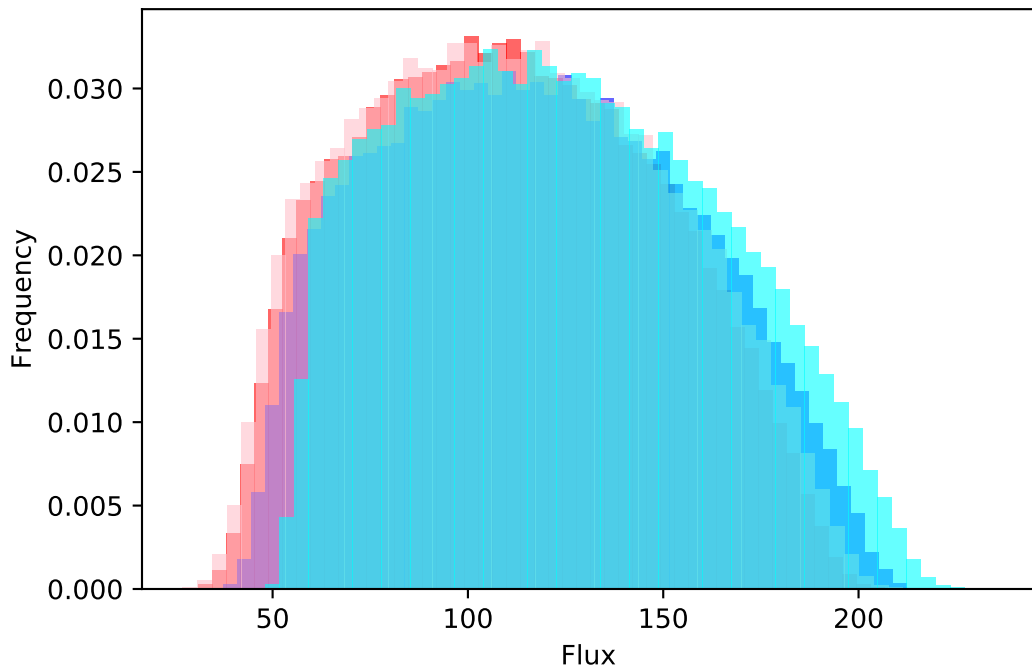
331 : DHAP_h + Pi_c --> DHAP_c + Pi_h
['-']
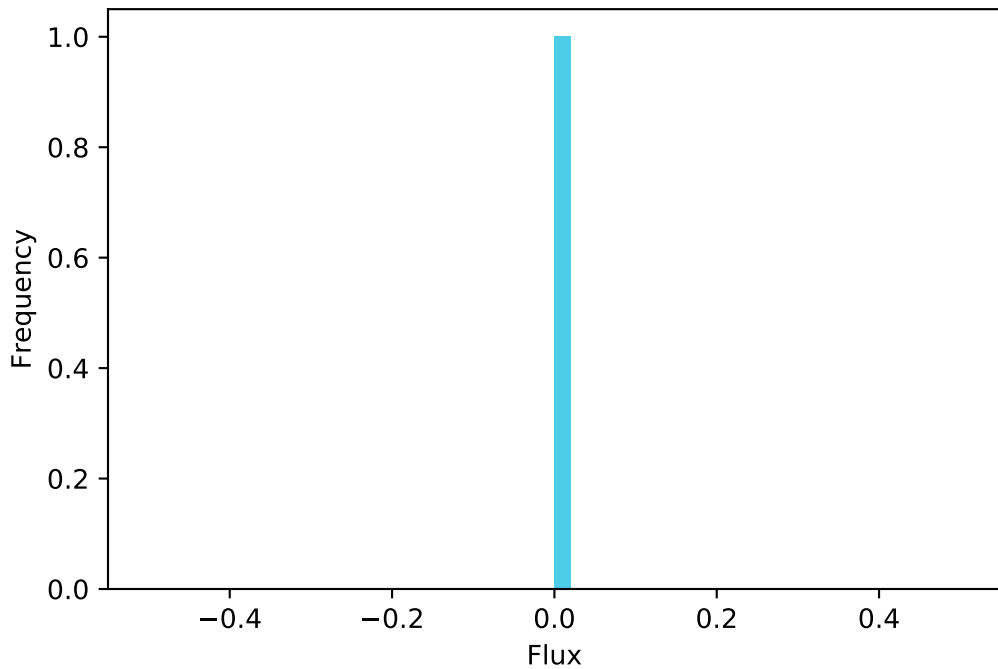
332 : PEP_c + Pi_h --> PEP_h + Pi_c
['-']
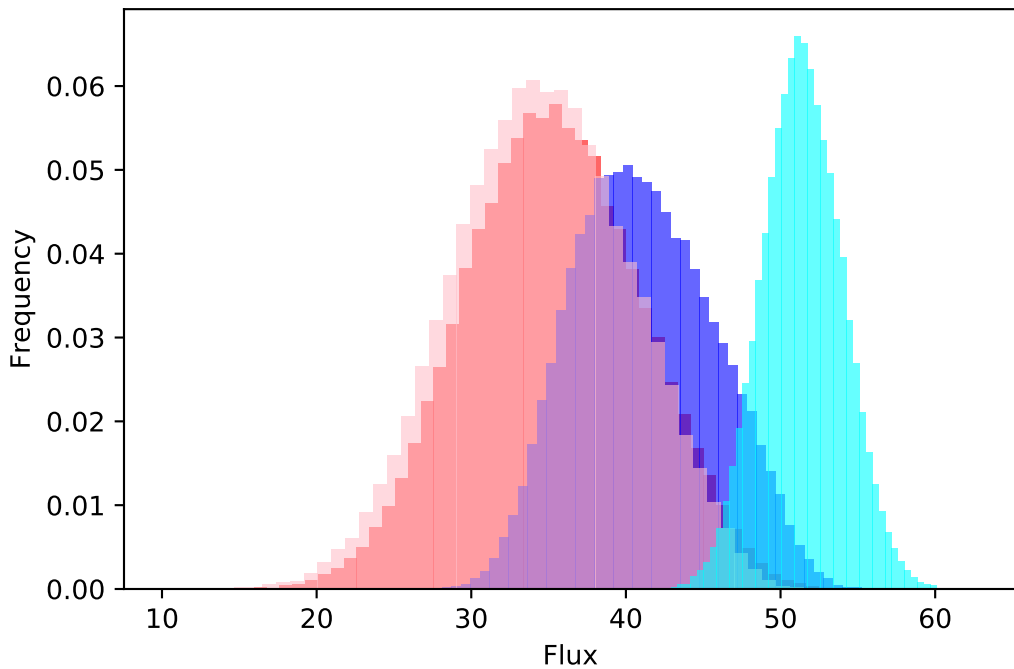
333 : GCA_h --> GCA_c
['-']
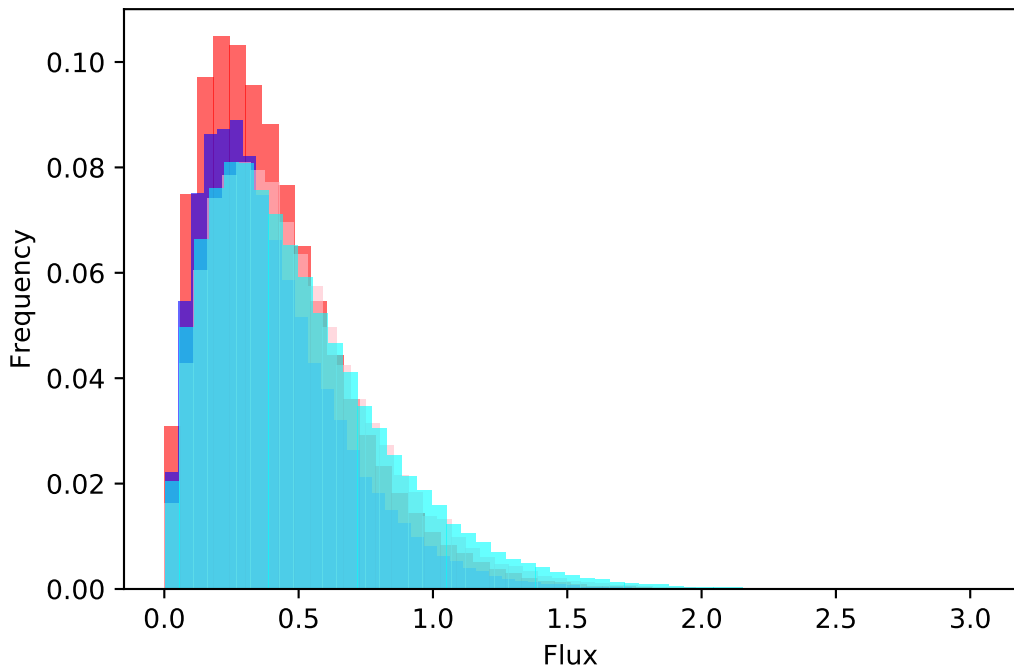
334 : GCEA_c --> GCEA_h
['-']
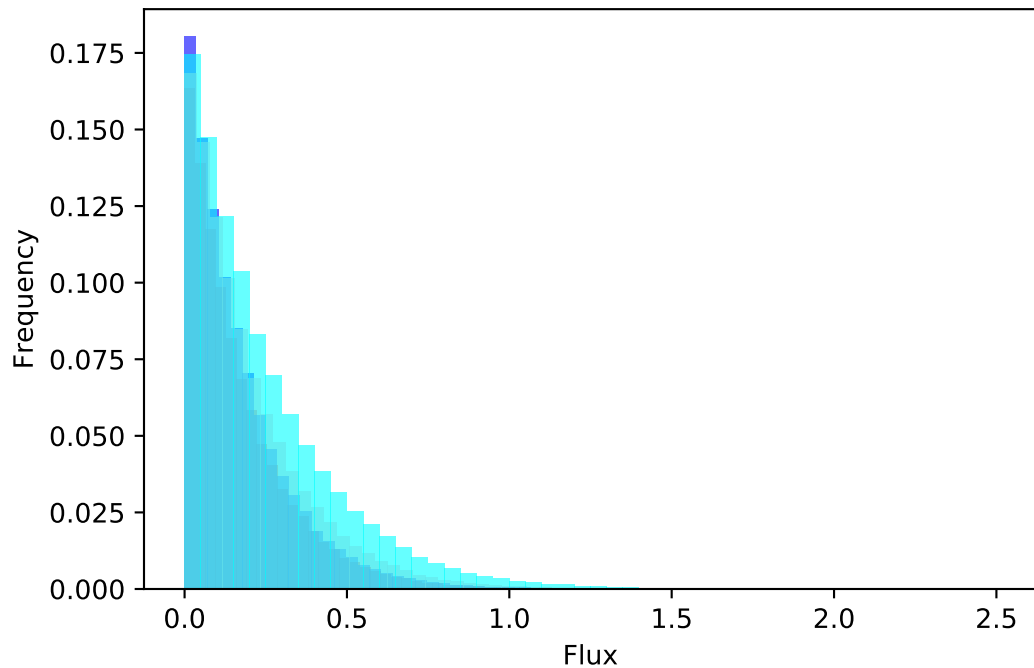
335 : G6P_c + Pi_h --> G6P_h + Pi_c
['-']
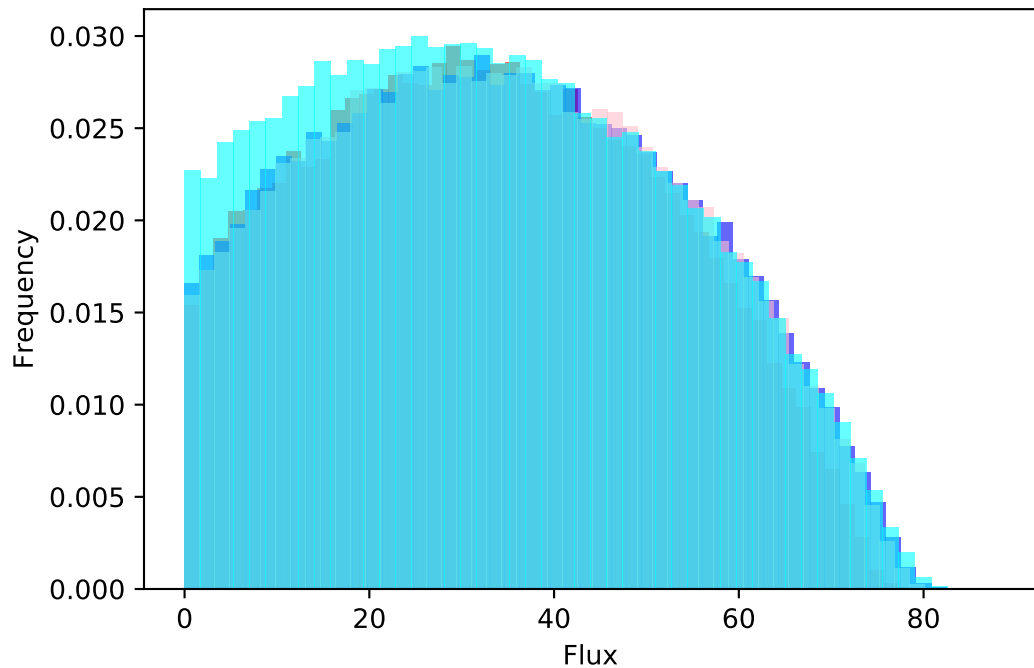
336 : Glc_h --> Glc_c
['-']
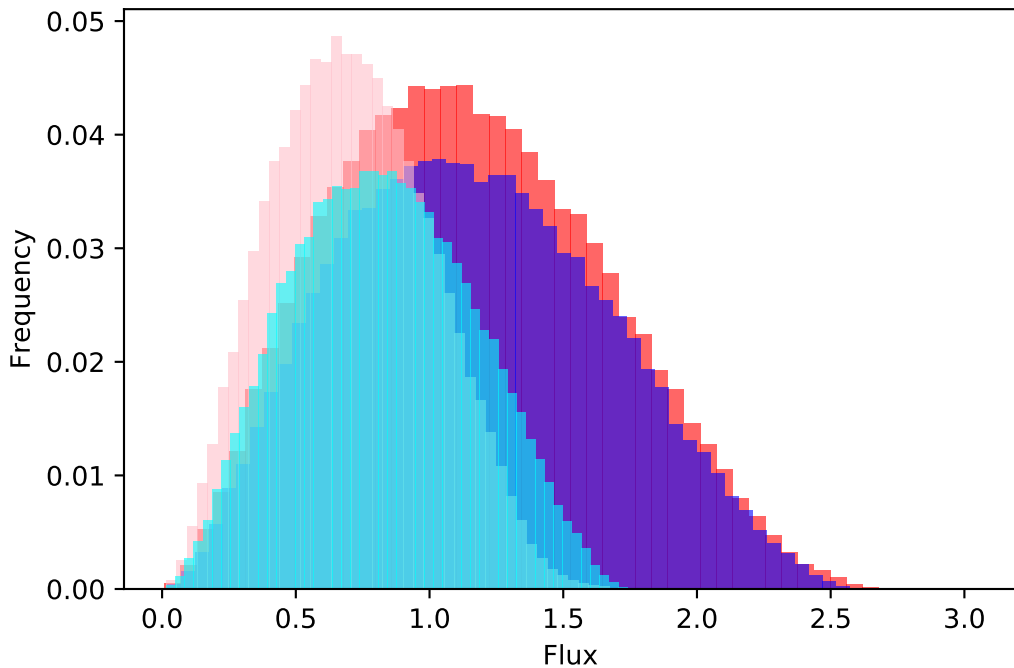
337 : Mas_h --> Mas_c
['-']
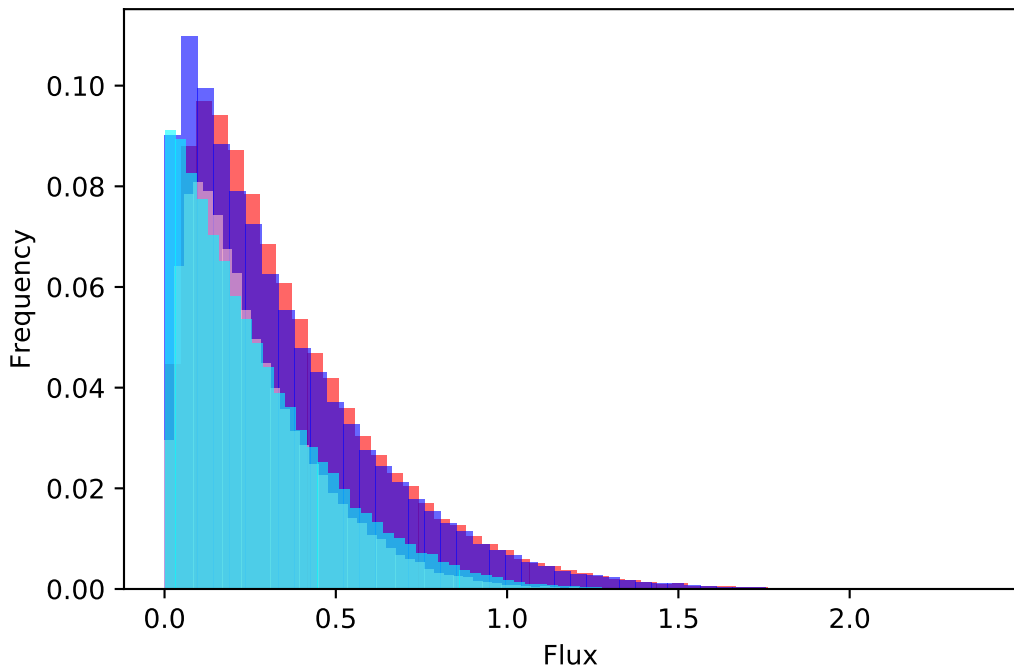
338 : Rib_c --> Rib_h
['-']
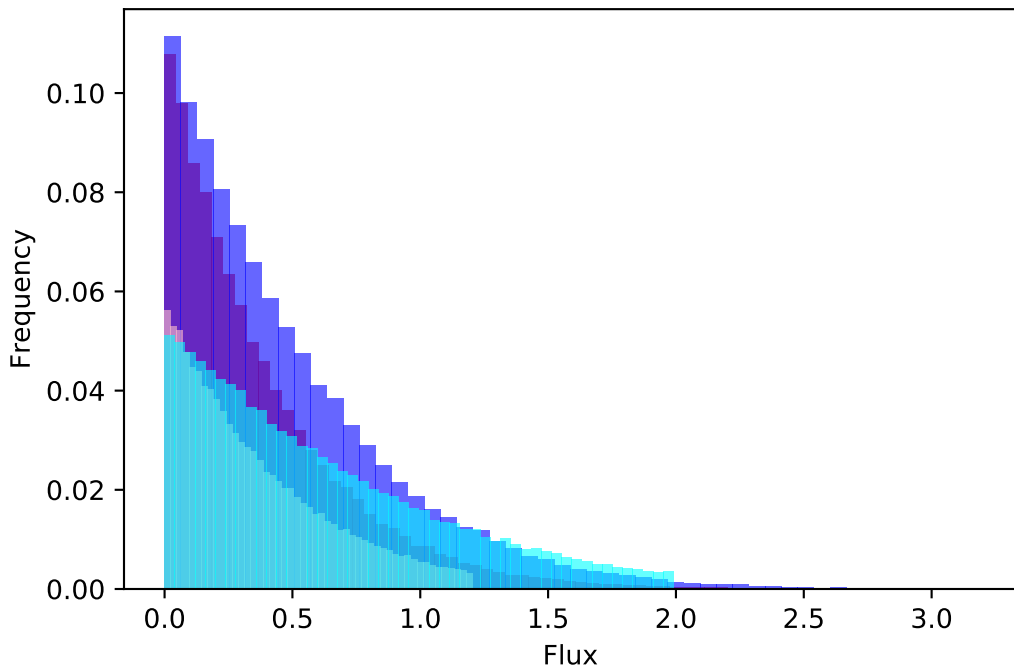
339 : Mal_c + Pi_m <=> Mal_m + Pi_c
['-']
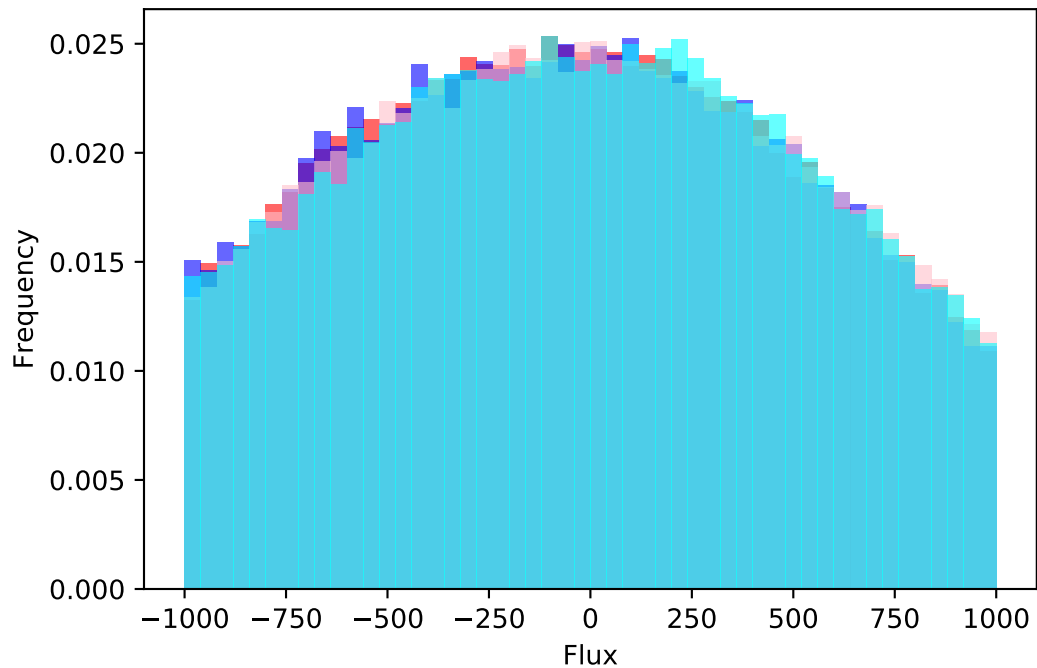
340 : Pi_m + SCA_c <=> Pi_c + SCA_m
['-']
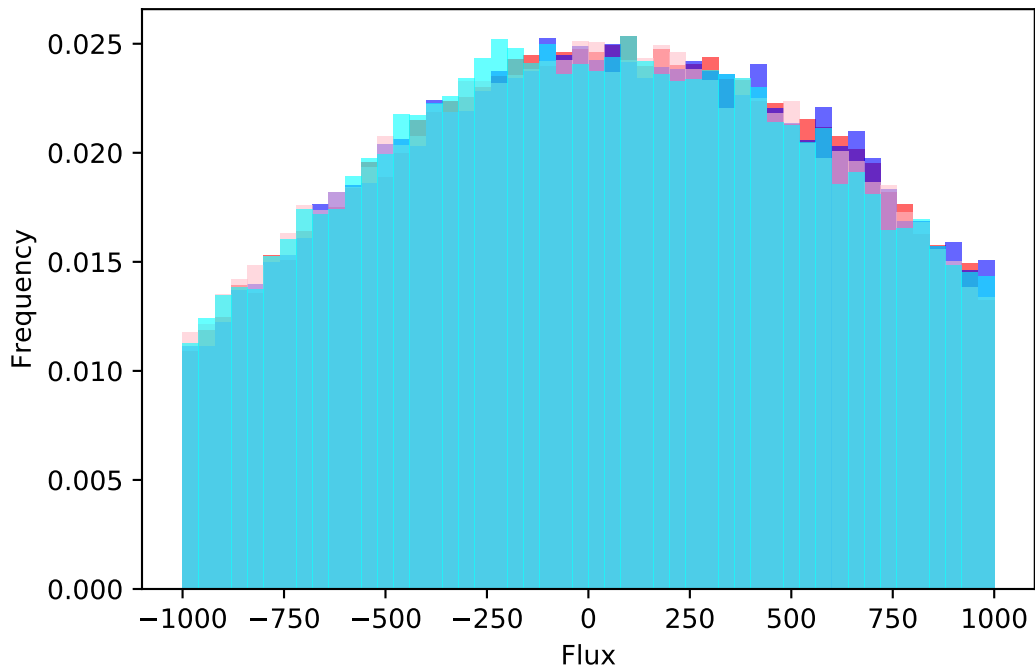
341 : KG_c + Mal_h --> KG_h + Mal_c
['-']
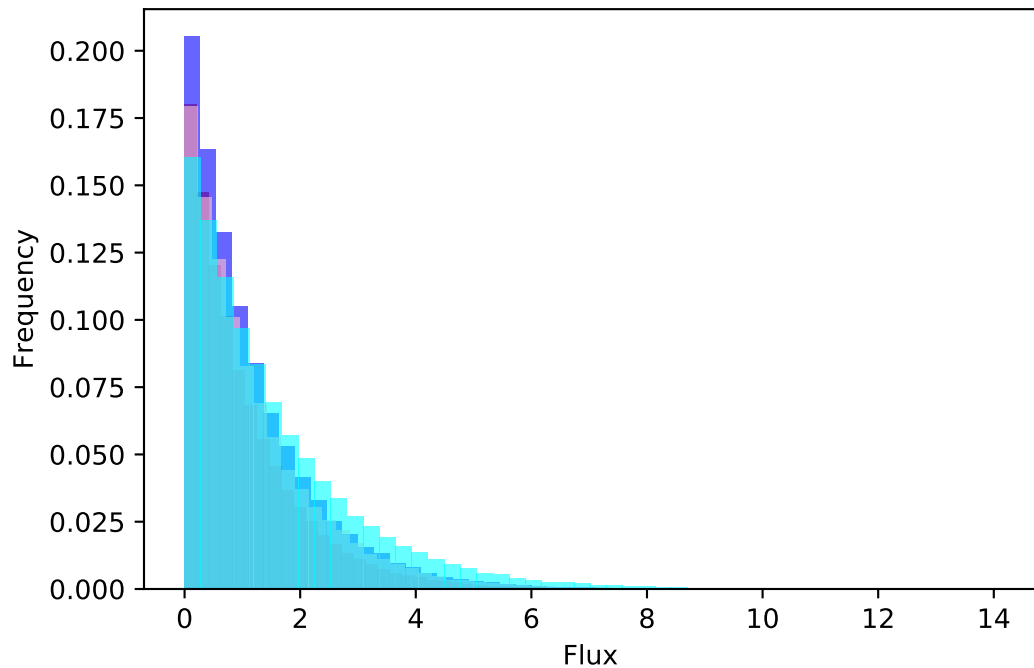
342 : Glu_h + Mal_c --> Glu_c + Mal_h
['-']
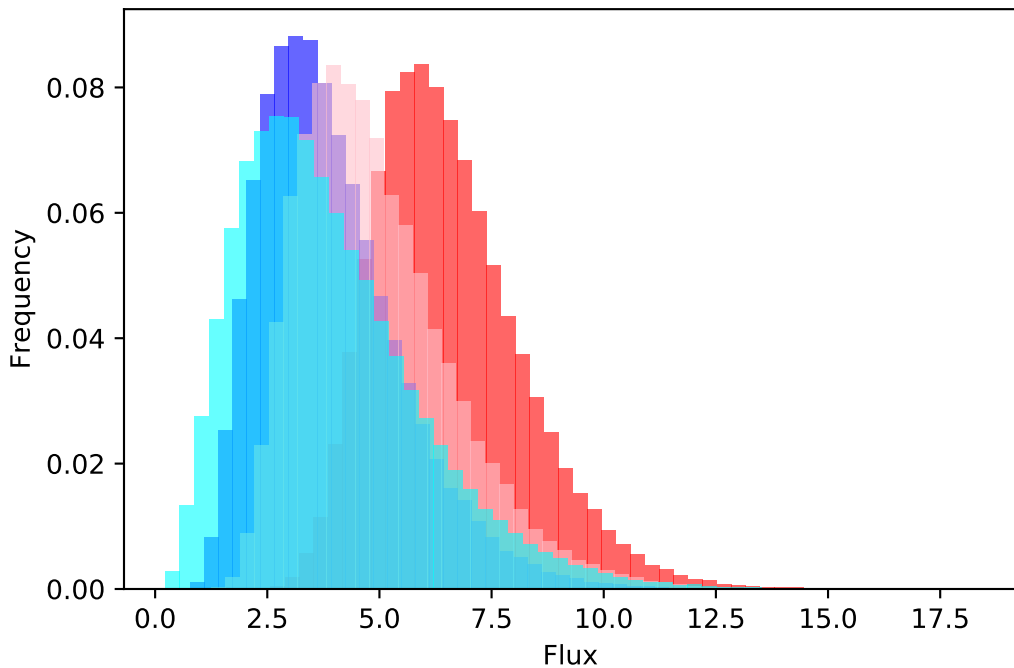
343 : Cit_m + KG_c <=> Cit_c + KG_m
['-']
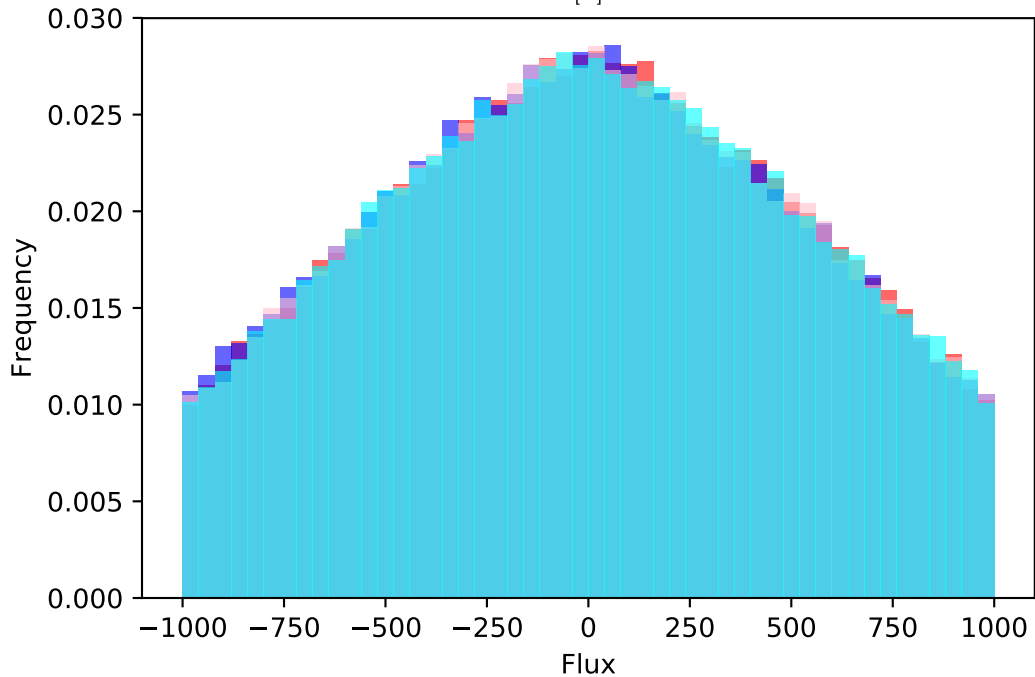
344 : KG_c + iCit_m <=> KG_m + iCit_c
['-']
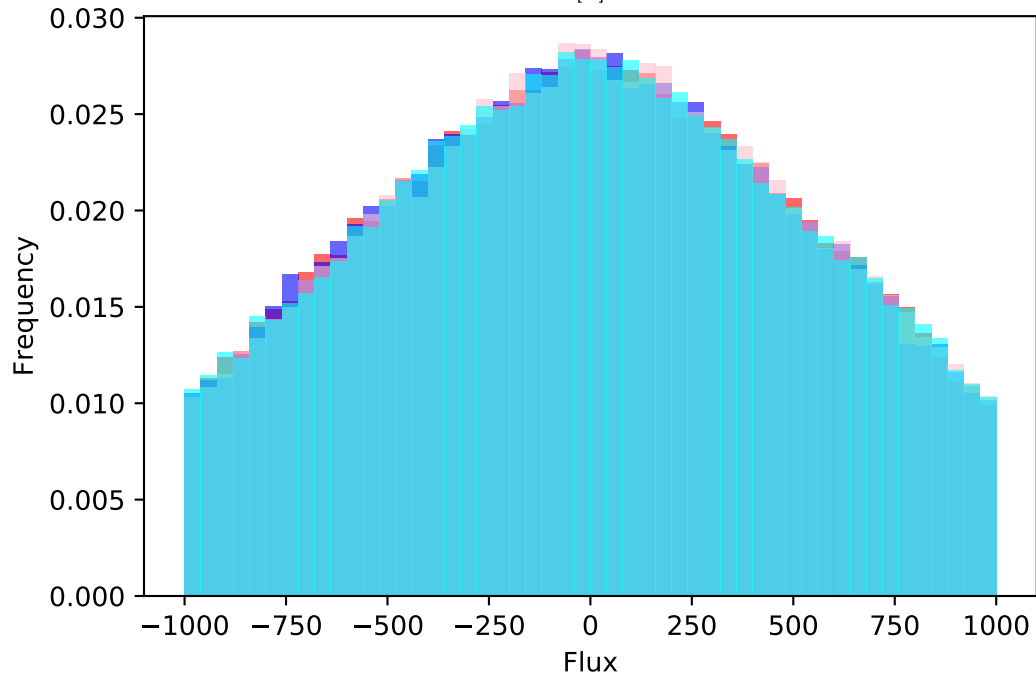
345 : KG_c + cACN_m <=> KG_m + cACN_c
['-']
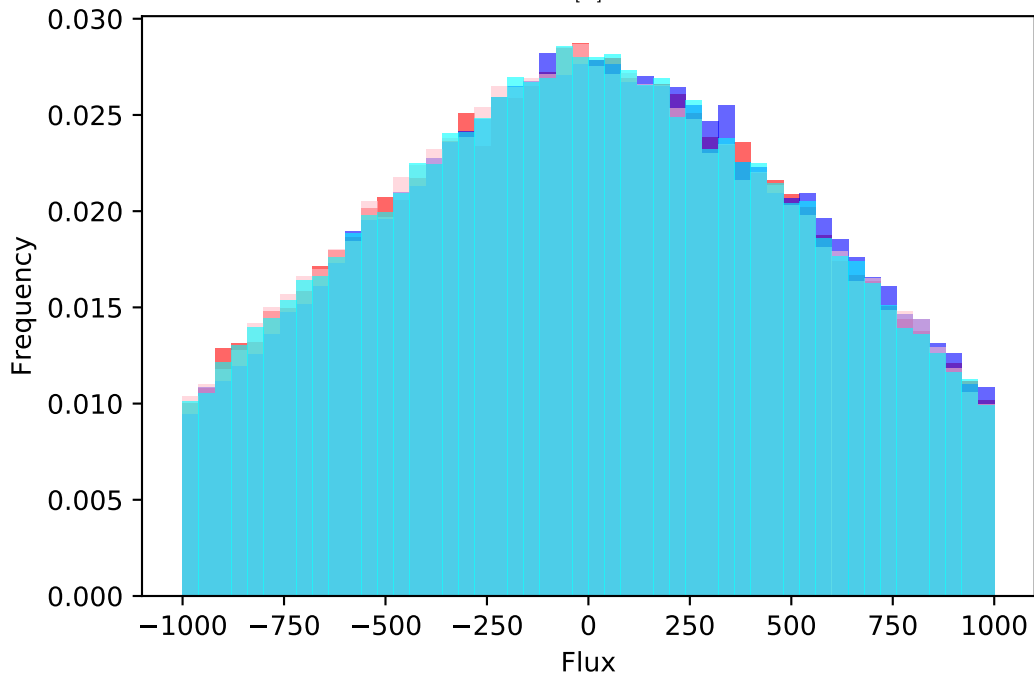
346 : Cit_m + Mal_c <=> Cit_c + Mal_m
['-']
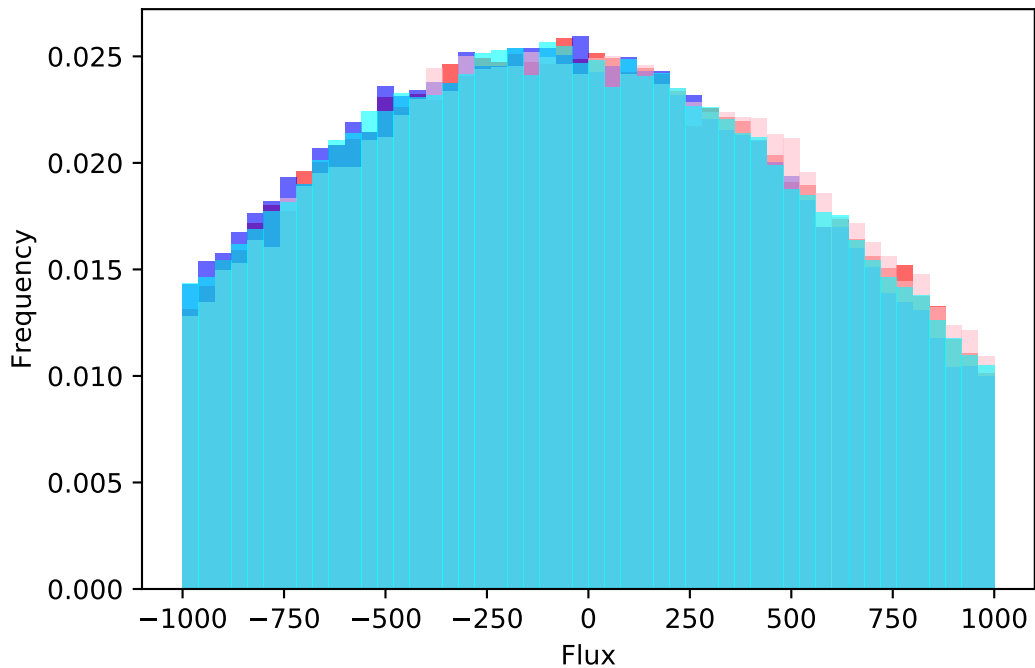
347 : Mal_c + iCit_m <=> Mal_m + iCit_c
['-']
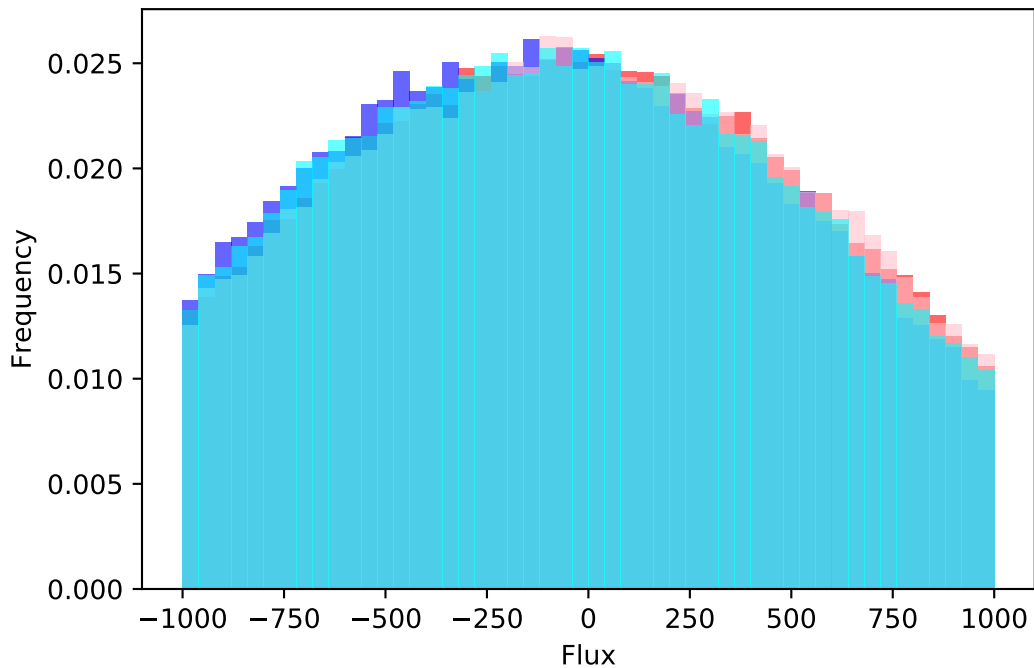
348 : Mal_c + cACN_m <=> Mal_m + cACN_c
['-']
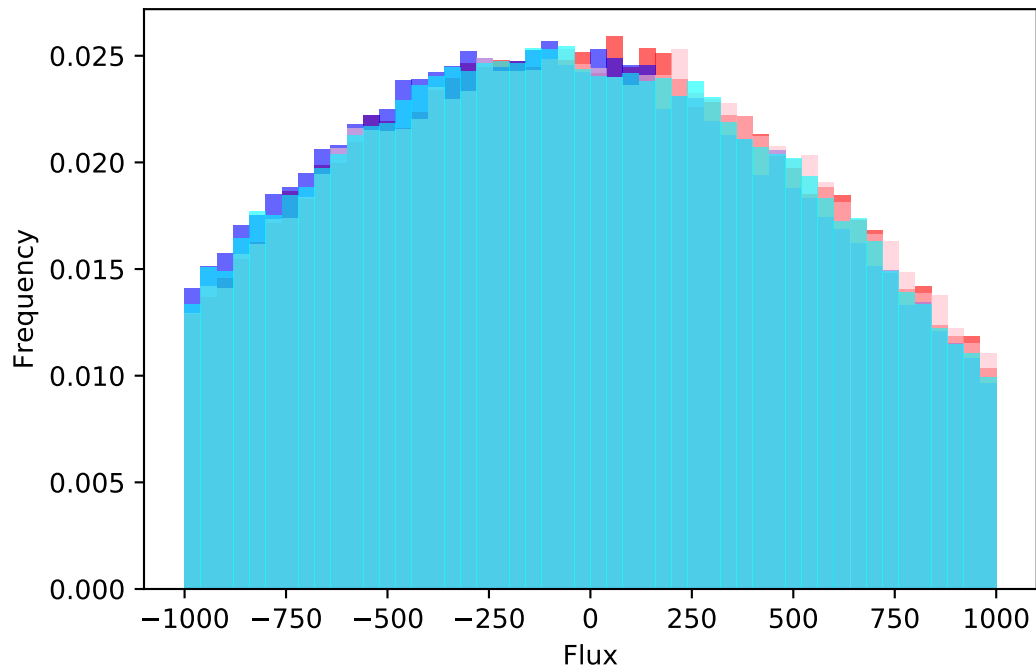
349 : Cit_m + OAA_c <=> Cit_c + OAA_m
['-']
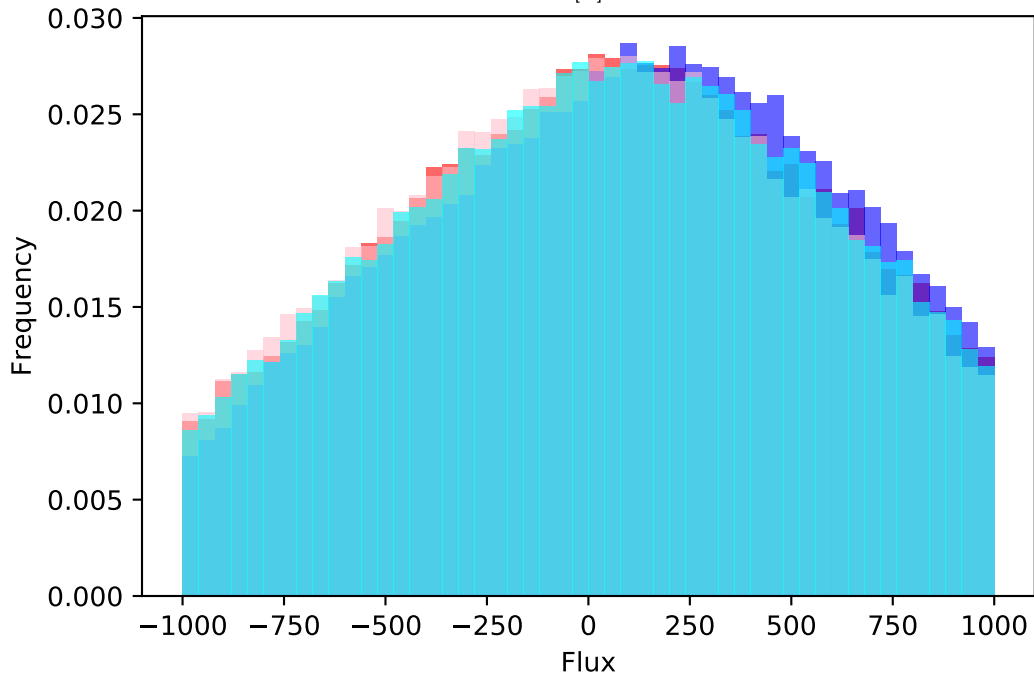
350 : OAA_c + iCit_m <=> OAA_m + iCit_c
['-']
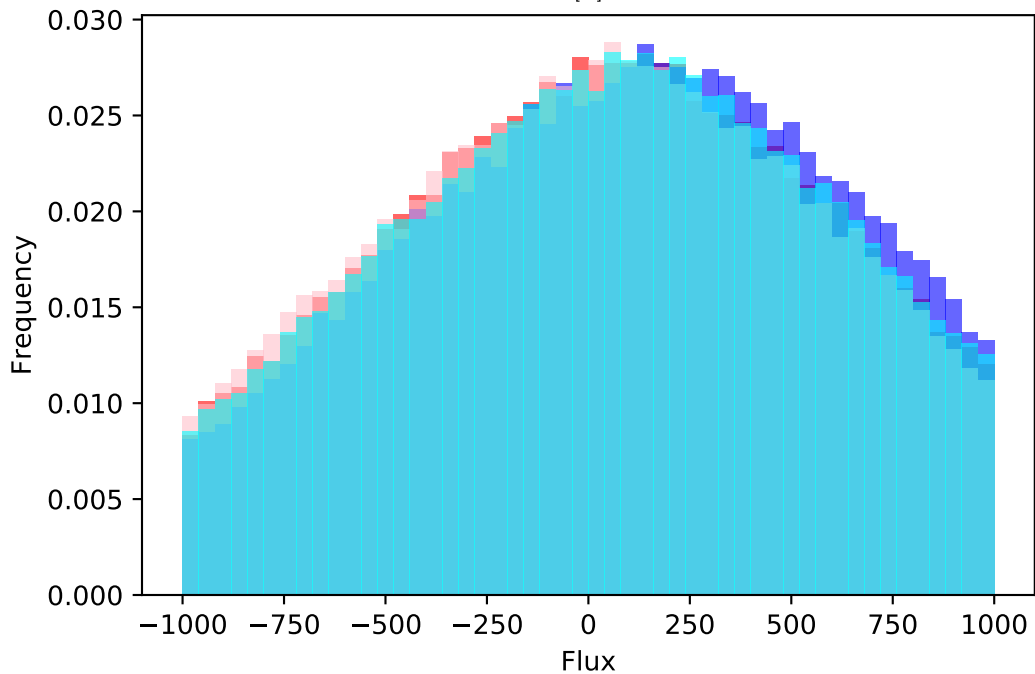
351 : OAA_c + cACN_m <=> OAA_m + cACN_c
['-']
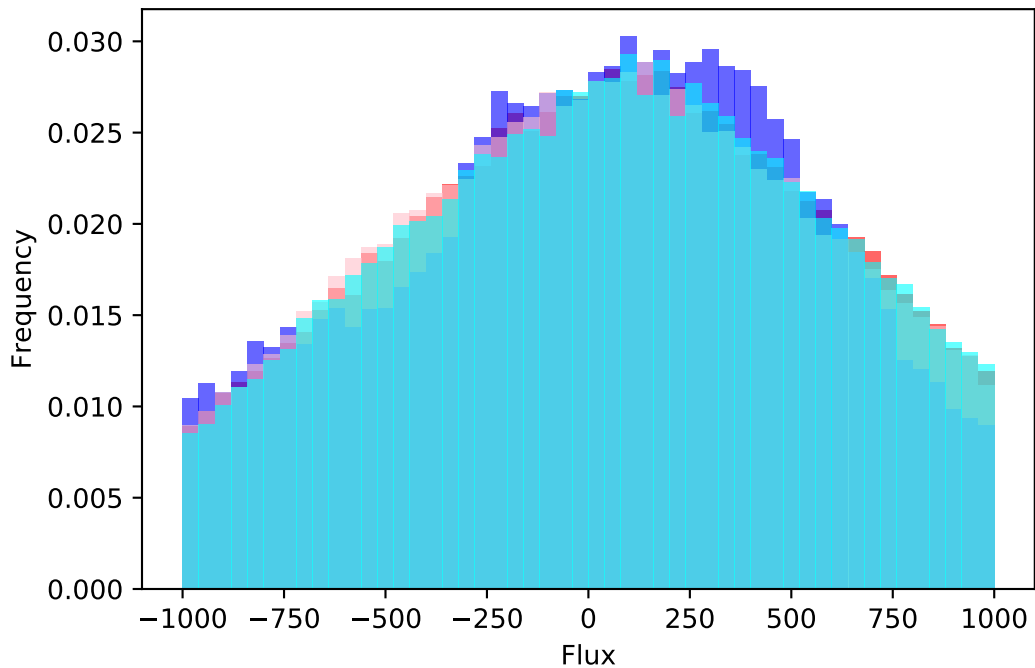
352 : Cit_m + SCA_c <=> Cit_c + SCA_m
['-']
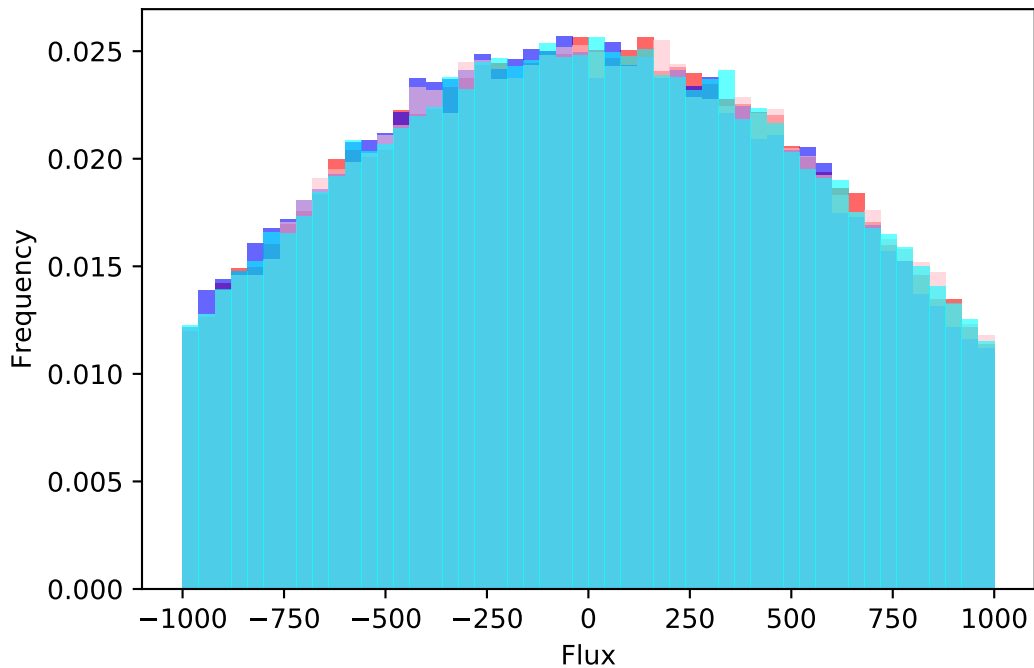
353 : SCA_c + iCit_m <=> SCA_m + iCit_c
['-']
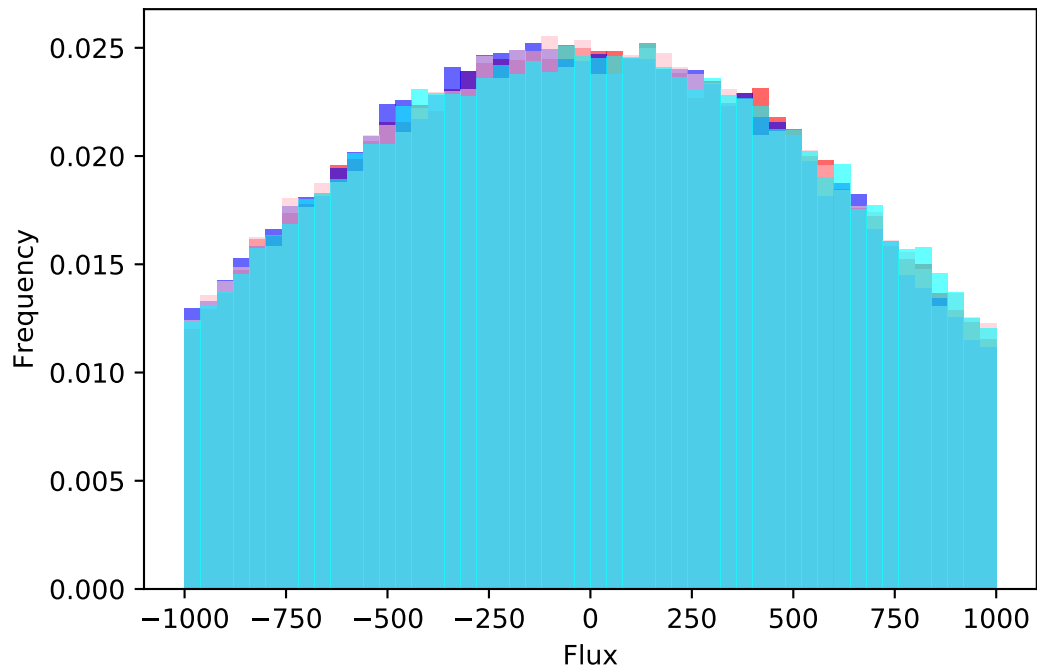
354 : SCA_c + cACN_m <=> SCA_m + cACN_c
['-']
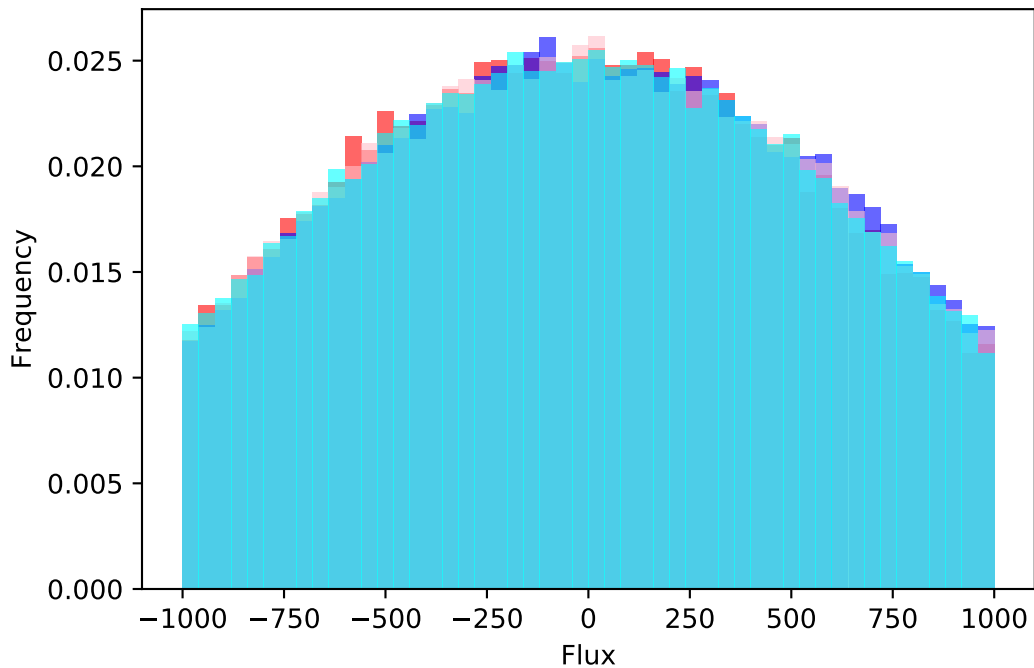
355 : Fum_m + SCA_c --> Fum_c + SCA_m
['-']
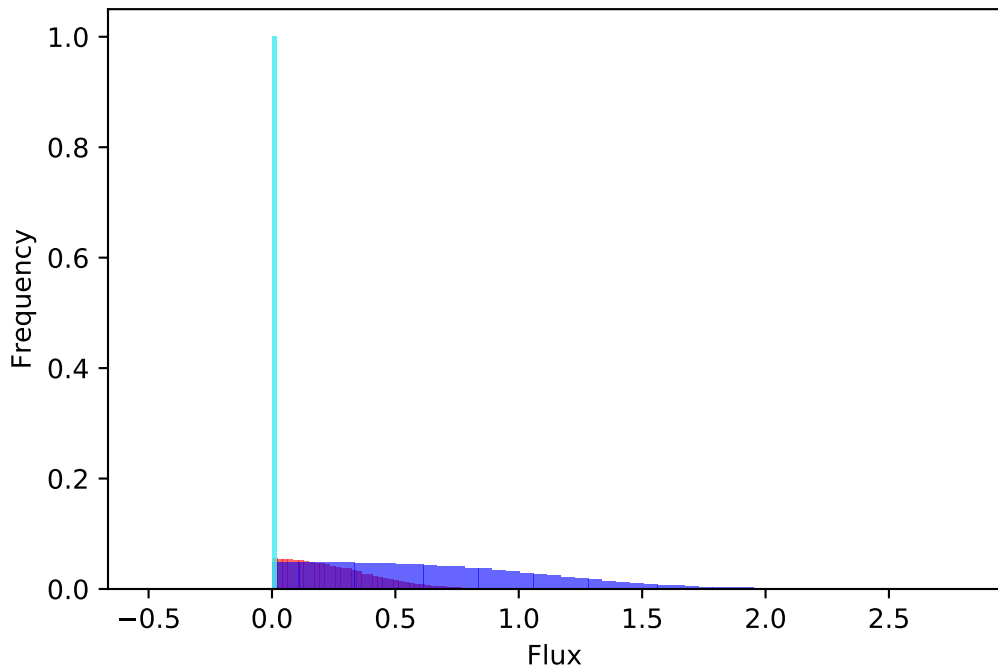
356 : Ala_c <=> Ala_m
['-']
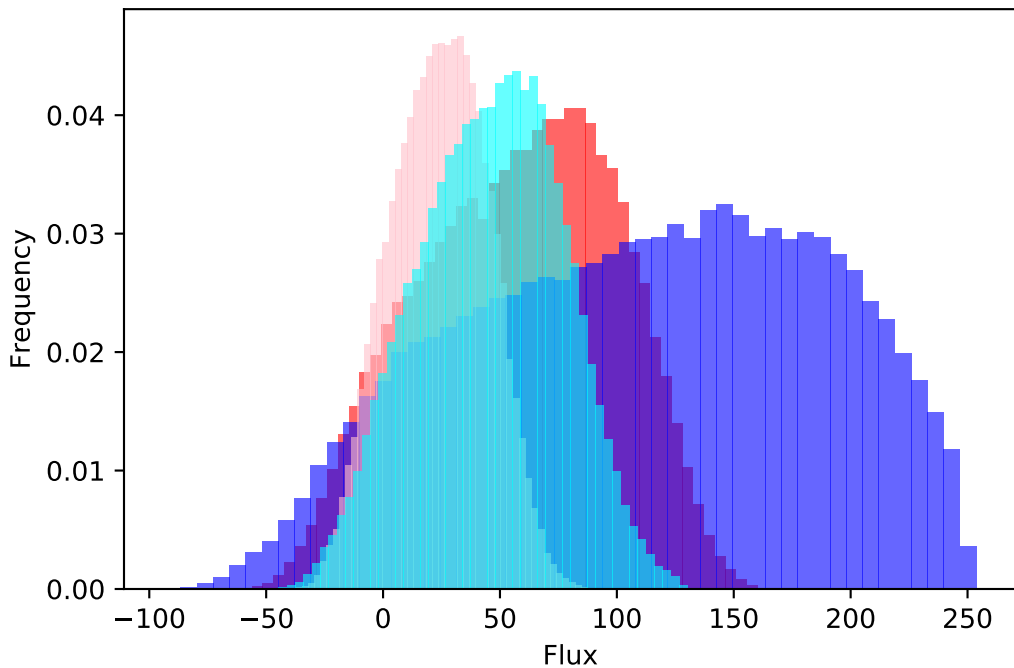
357 : Arg_c <=> Arg_m
['-']
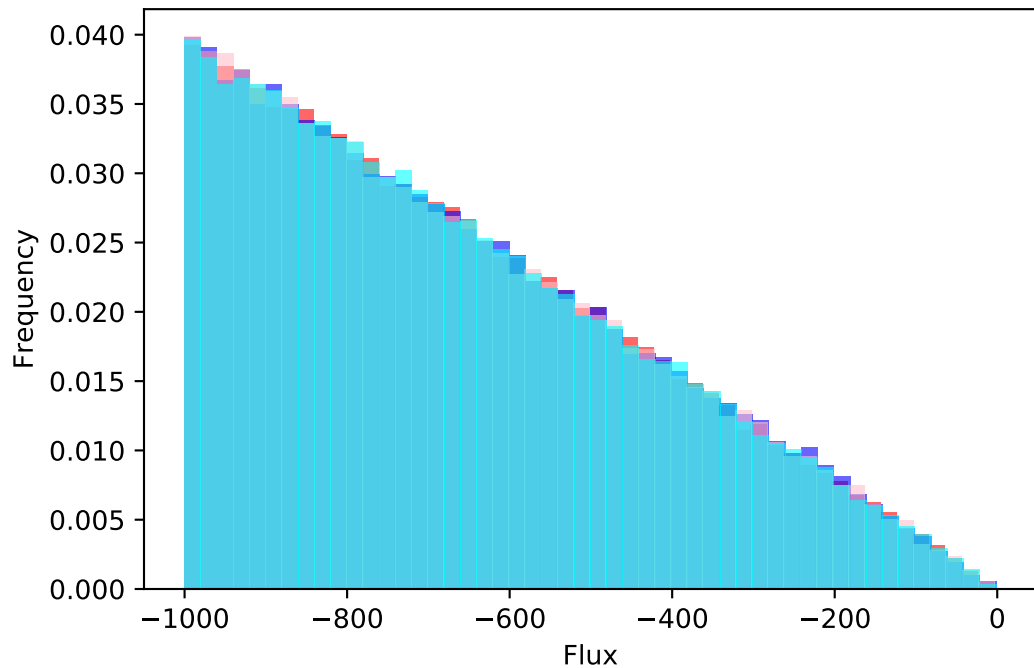
358 : Glu_c <=> Glu_m
['-']
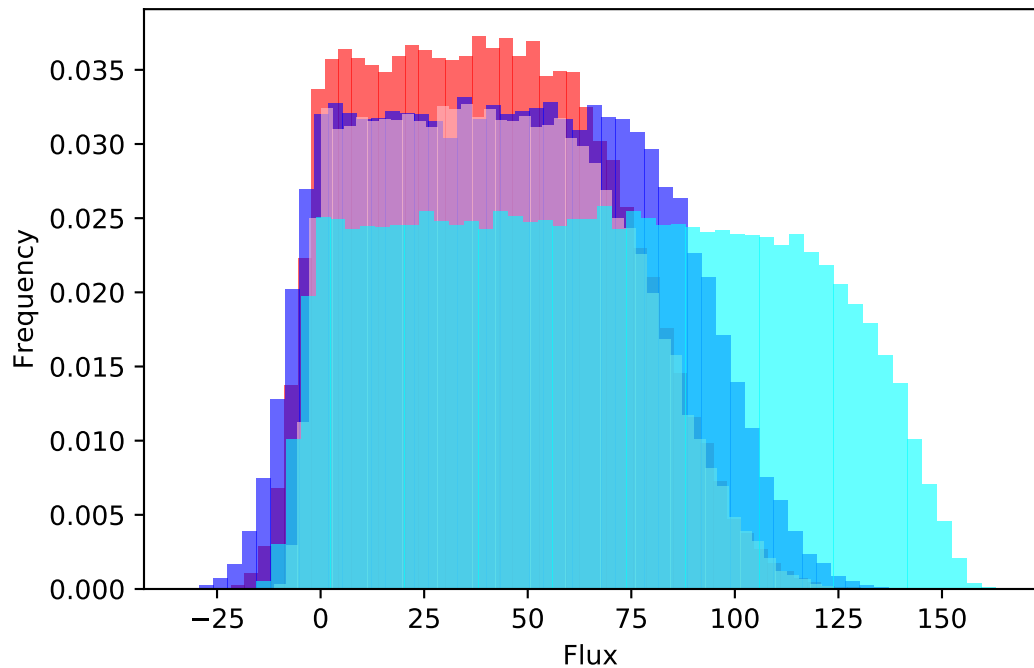
359 : Lys_c <=> Lys_m
['-']
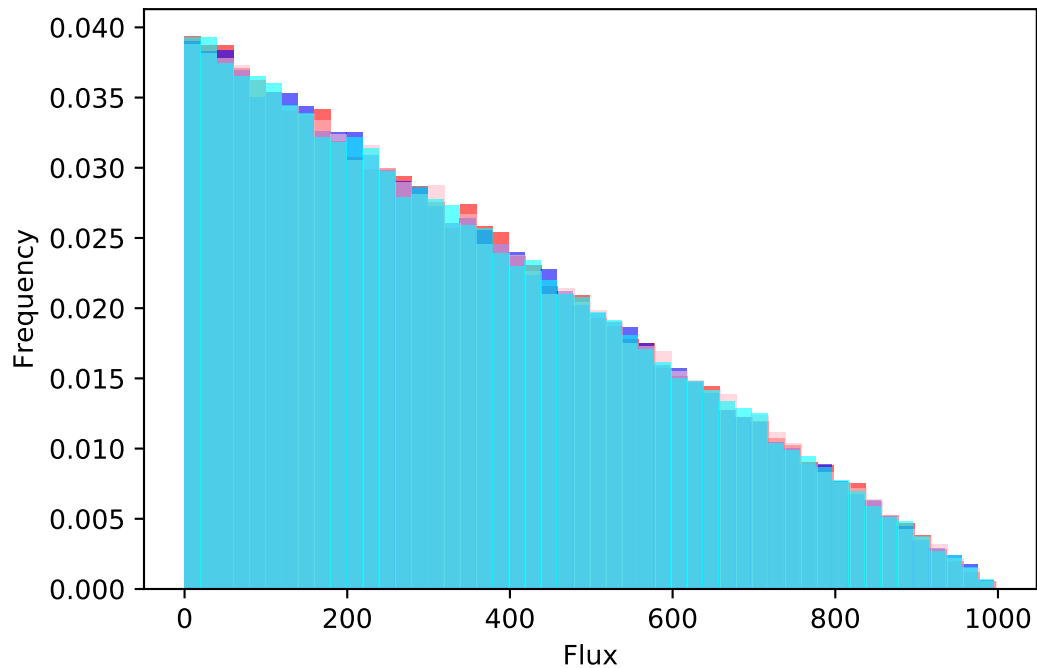
360 : GABA_c <=> GABA_m
['-']
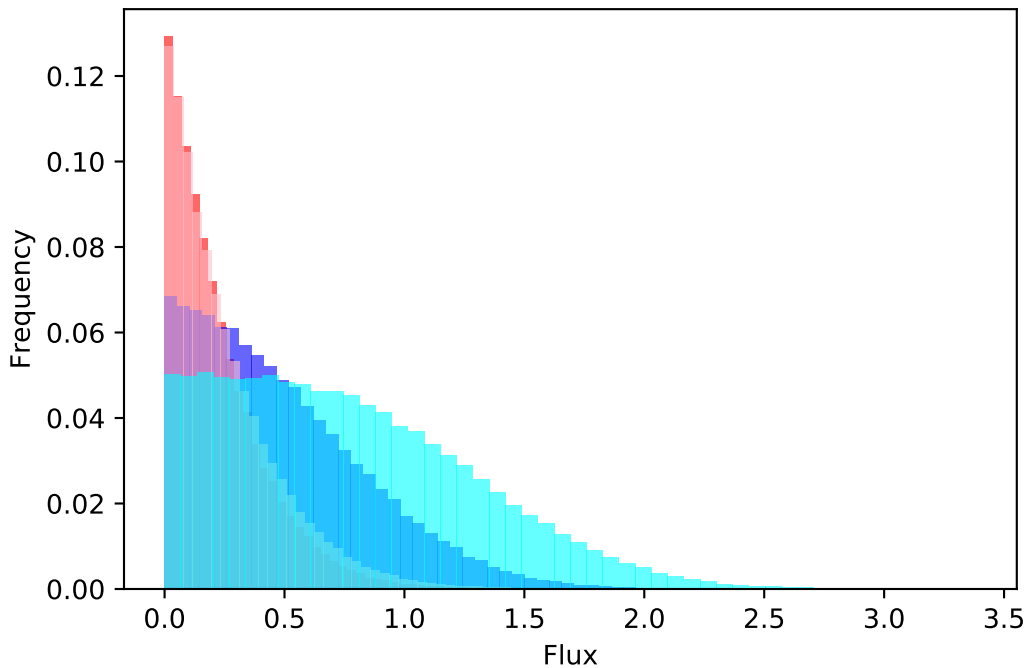
361 : Arg_c + His_m --> Arg_m + His_c
['-']
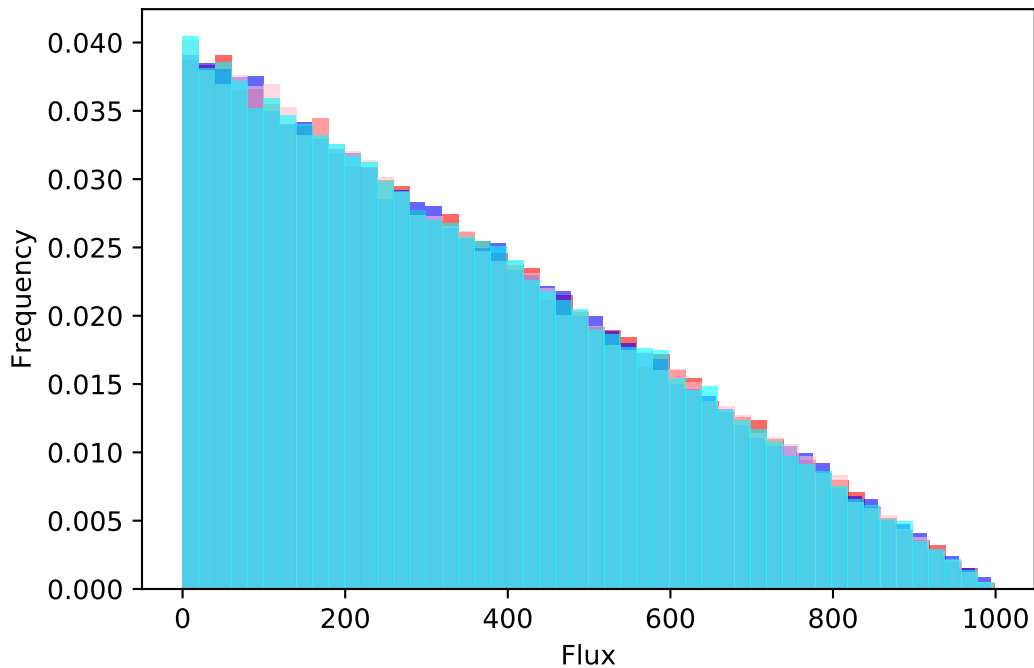
362 : Arg_c + Lys_m --> Arg_m + Lys_c
['-']
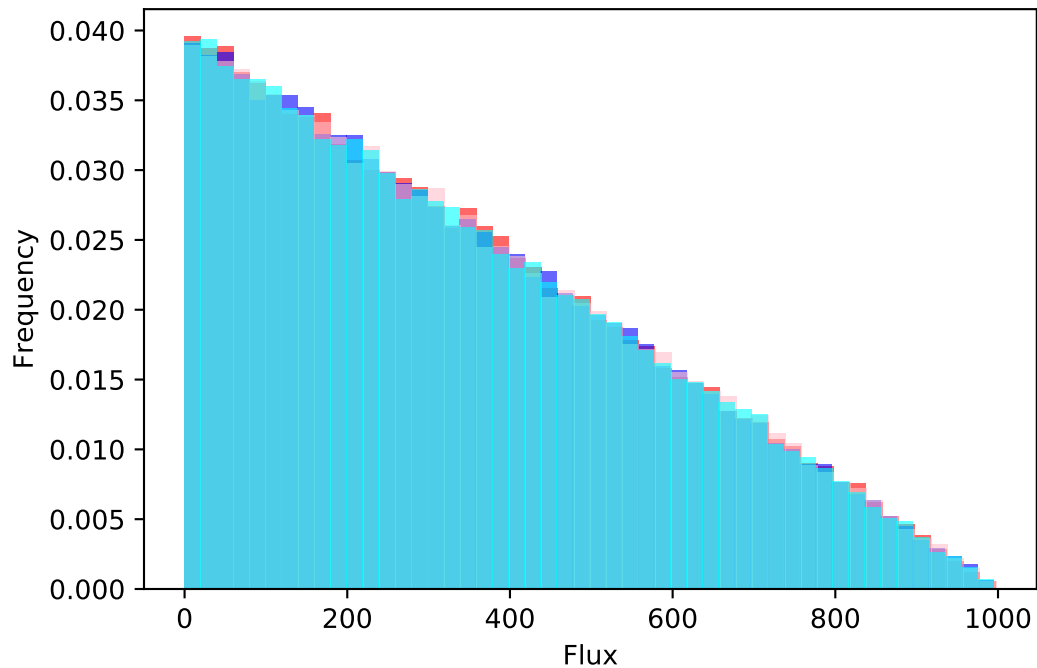
363 : Pro_c --> Pro_m
['-']
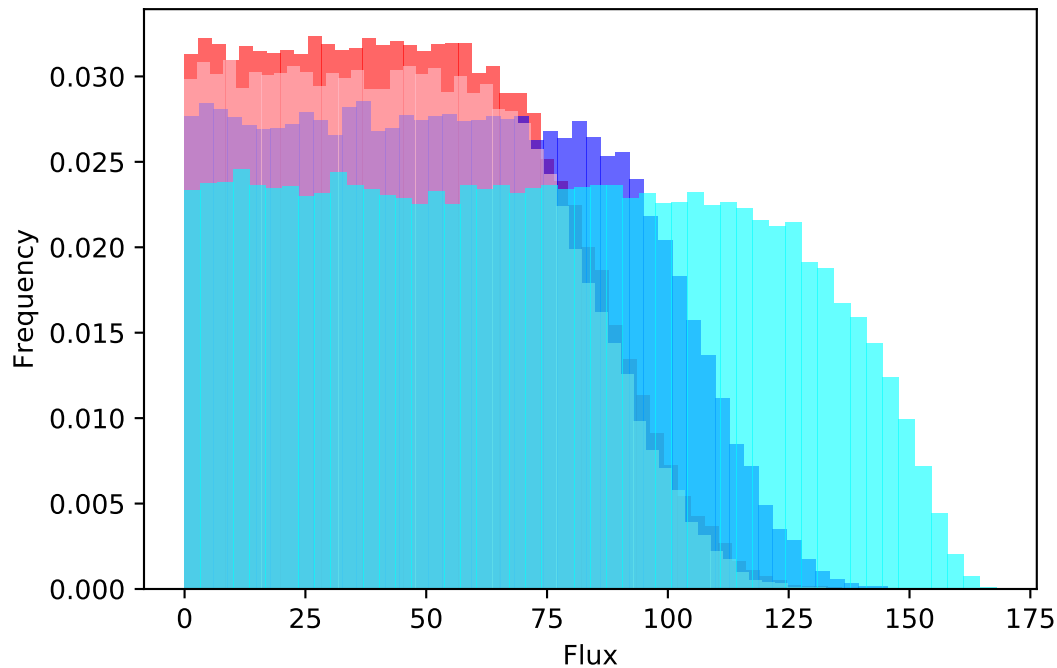
364 : Glu_m + Pro_c --> Glu_c + Pro_m
['-']
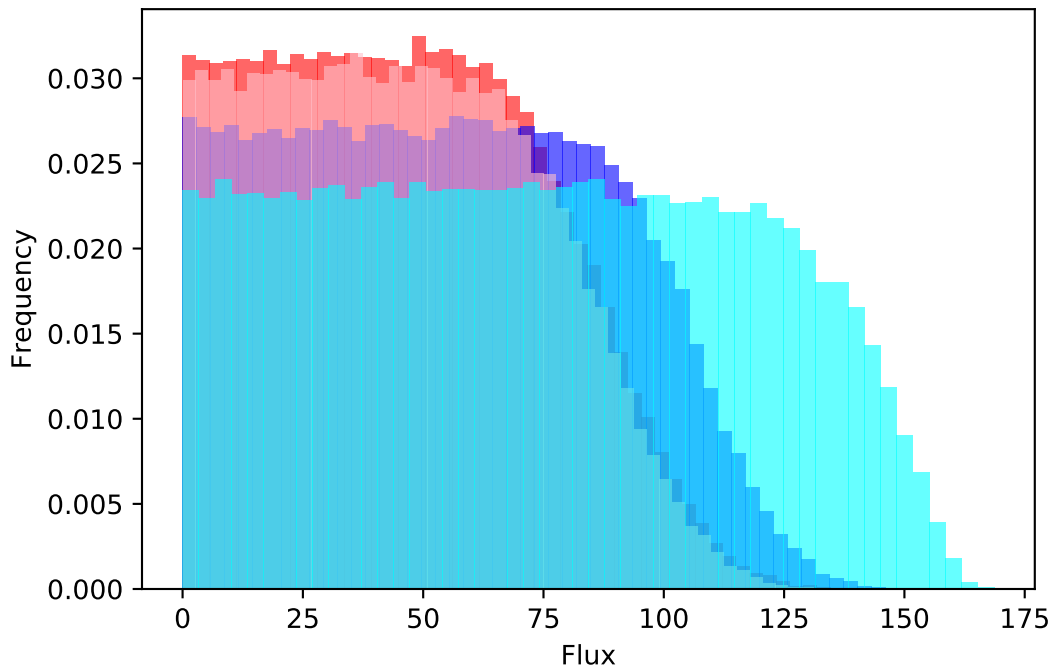
365 : P5C_h --> P5C_c
['-']
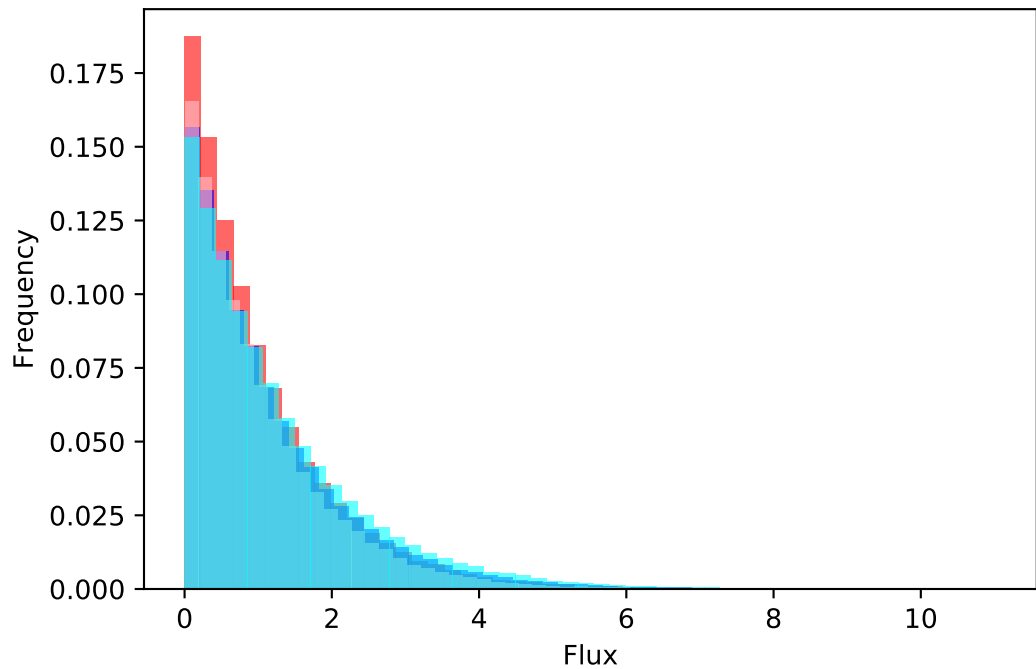
366 : P5C_m --> P5C_c
['-']
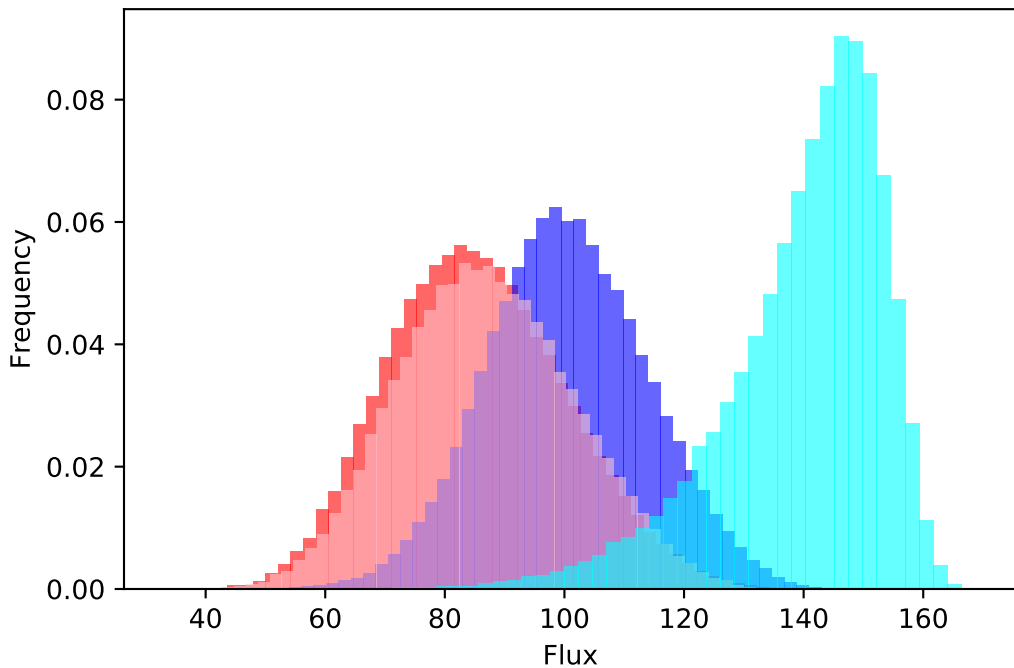
367 : H_h + PRPP_h --> PRPP_c
['-']
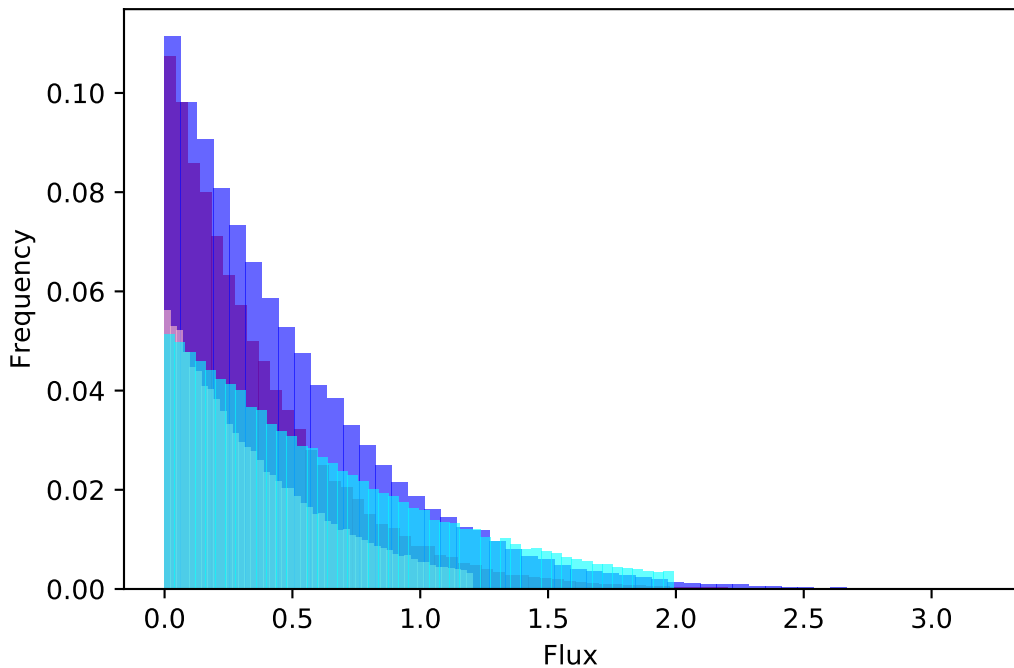
368 : Fum_h --> Fum_c
['-']
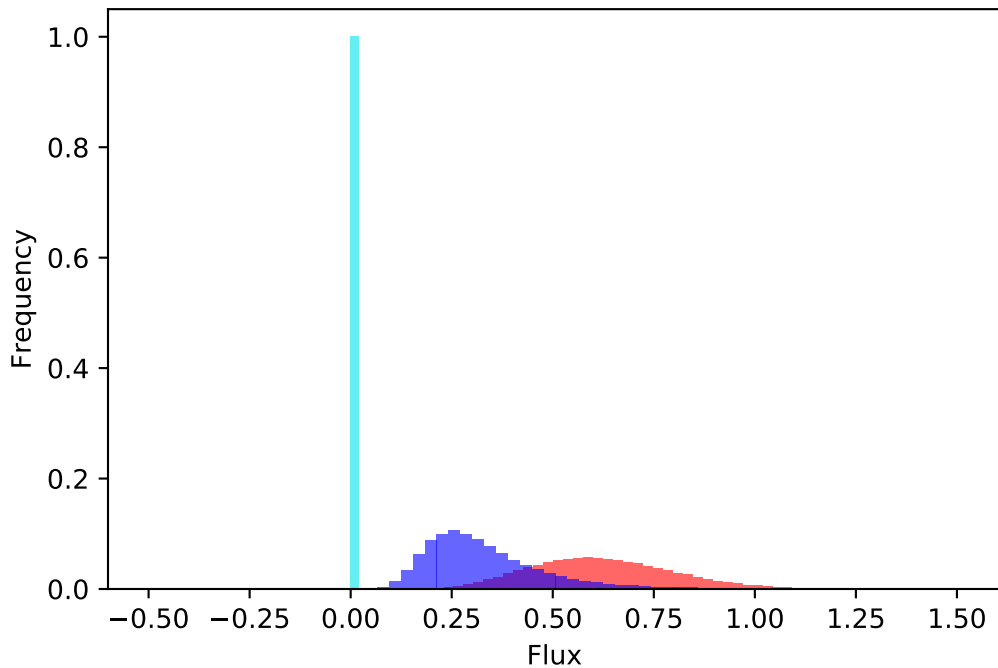
369 : H_DASH_Cys_h --> H_DASH_Cys_c
['-']
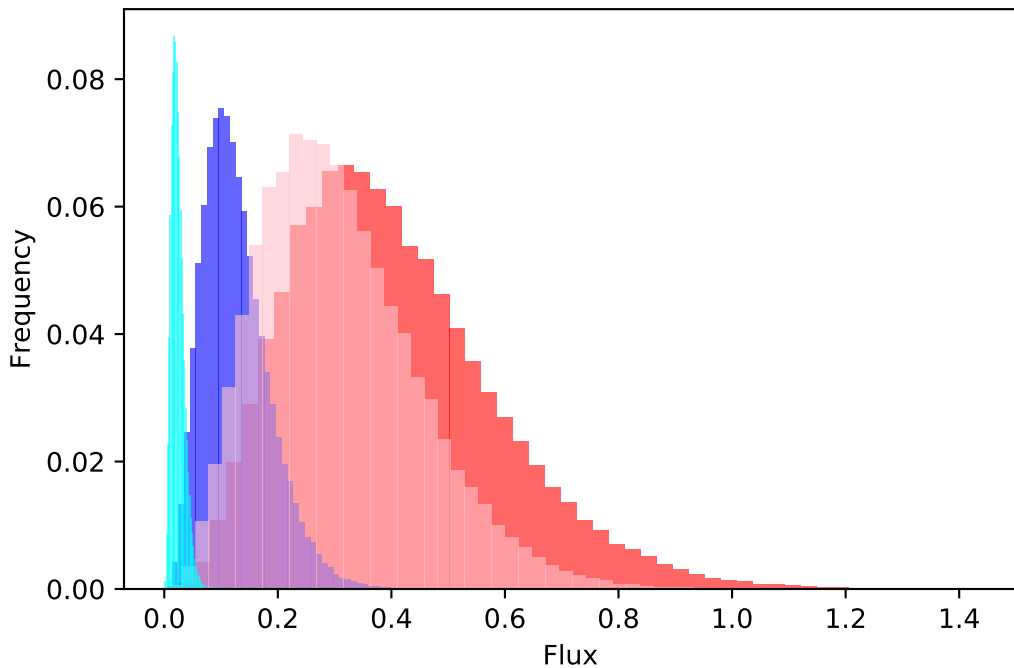
370 : orO_m --> orO_c
['-']
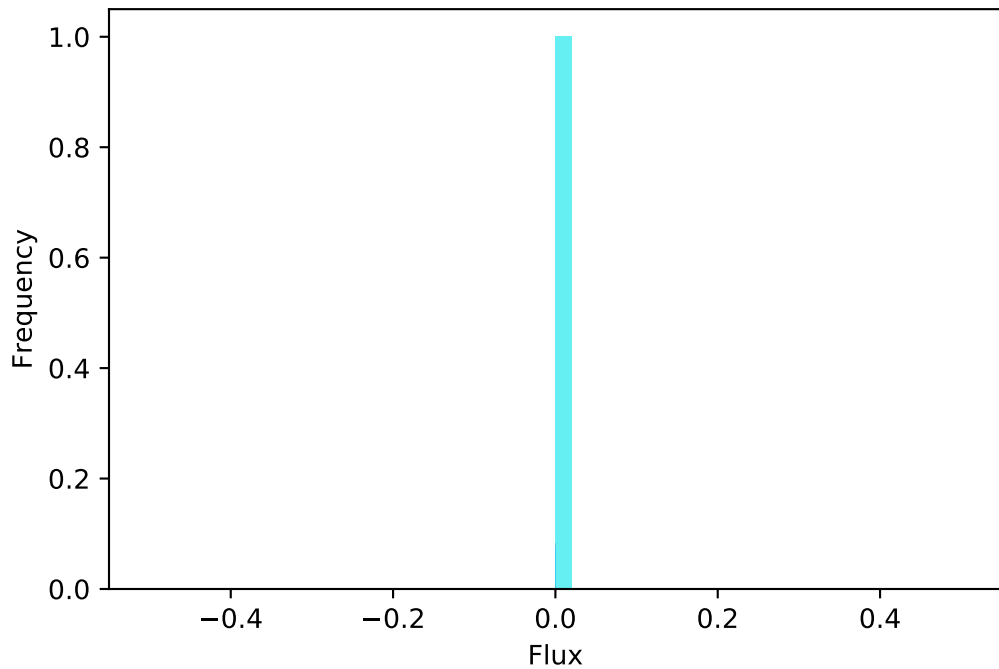
371 : DHO_h --> DHO_c
['-']
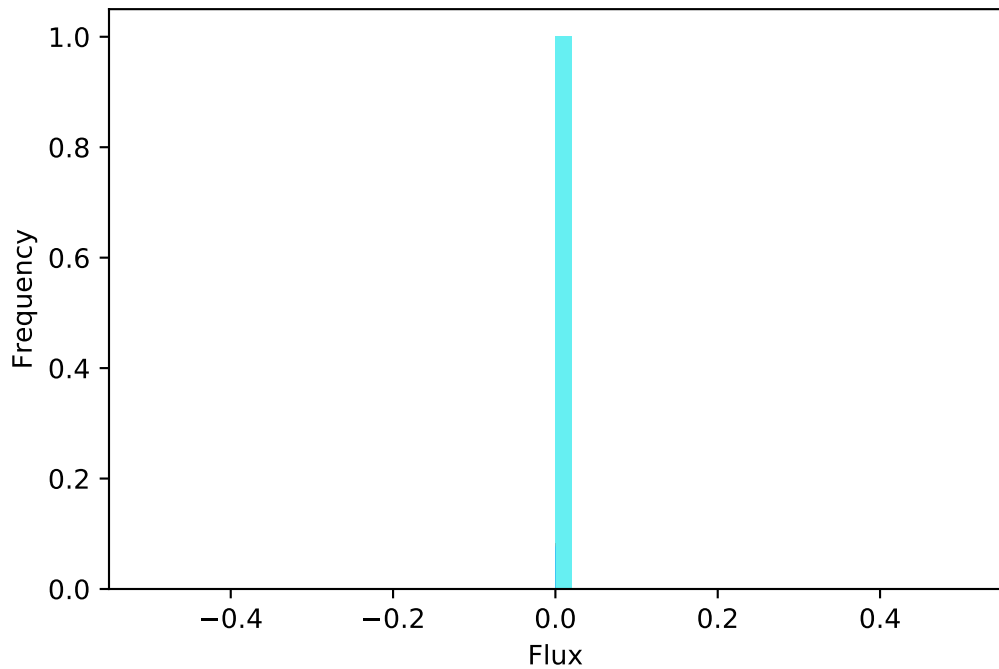
372 : DHO_c --> DHO_m
['-']

373 : Gly_c + Ser_m --> Gly_m + Ser_c
['-']
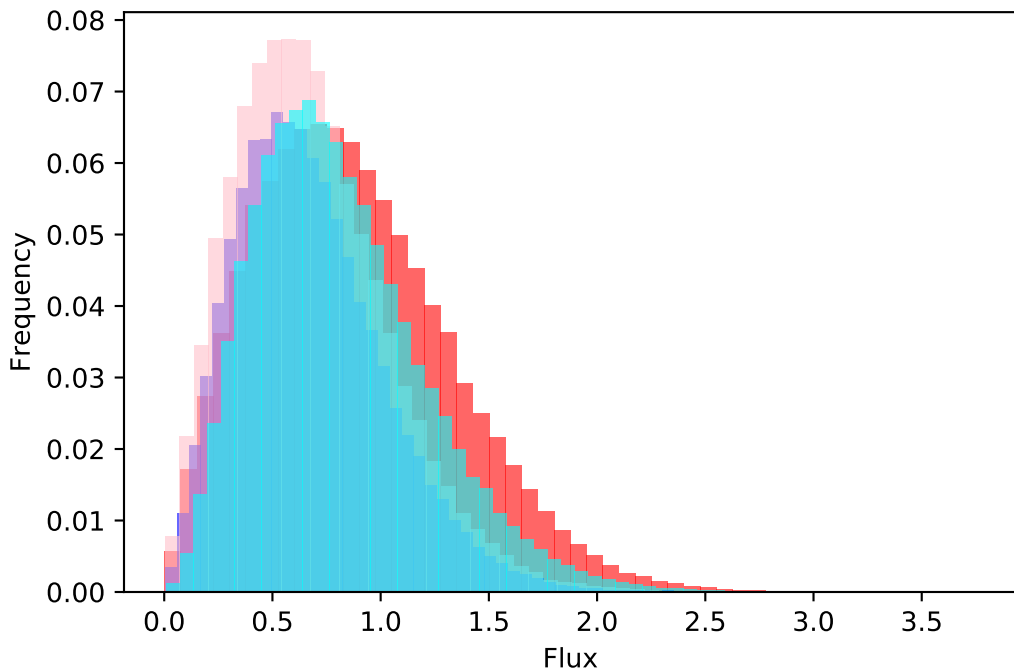
374 : O2_c <=> O2_h
['-']
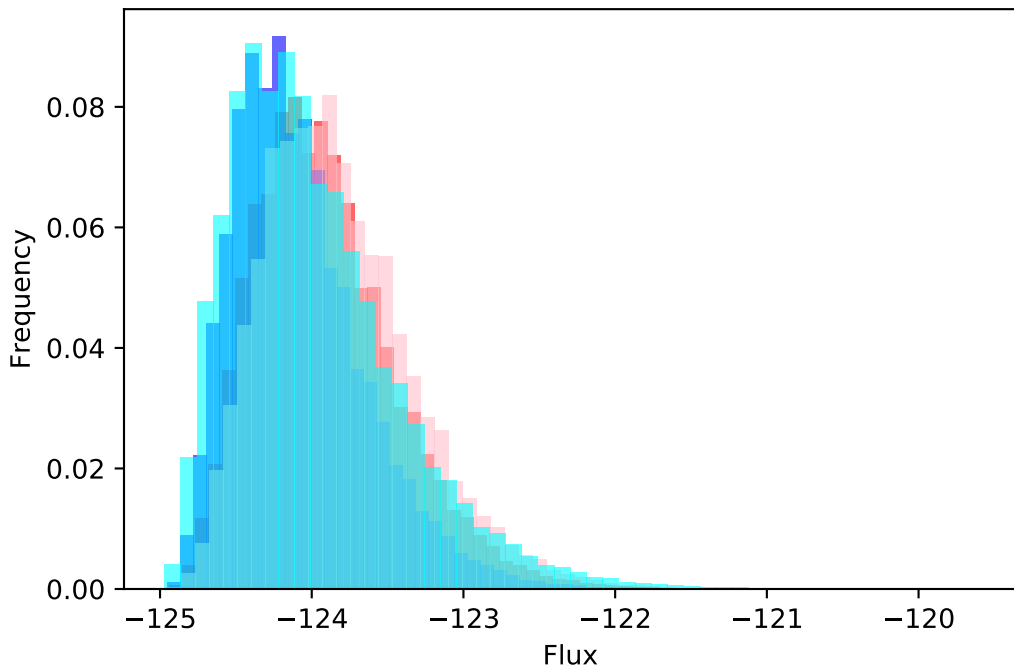
375 : O2_c <=> O2_m
['-']
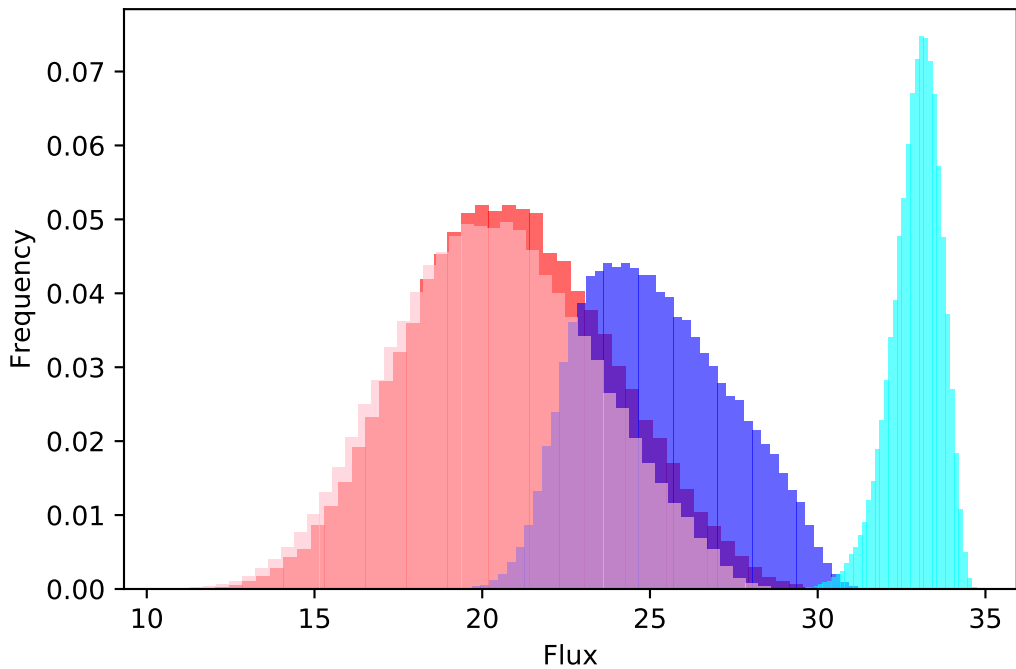
376 : O2_c <=> O2_p
['-']
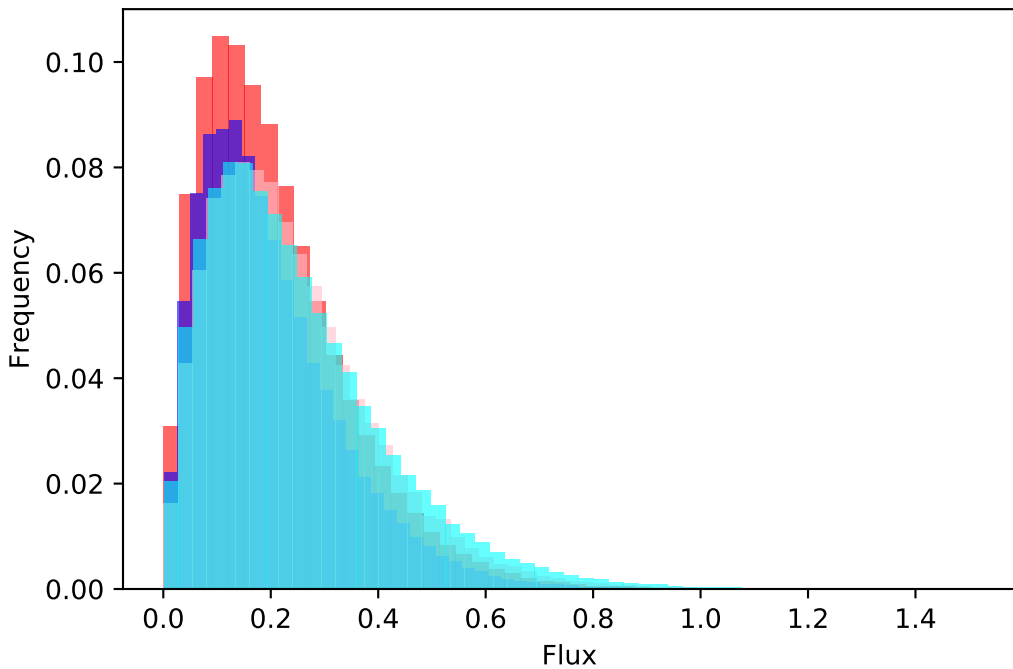
377 : CO2_c <=> CO2_h
['-']
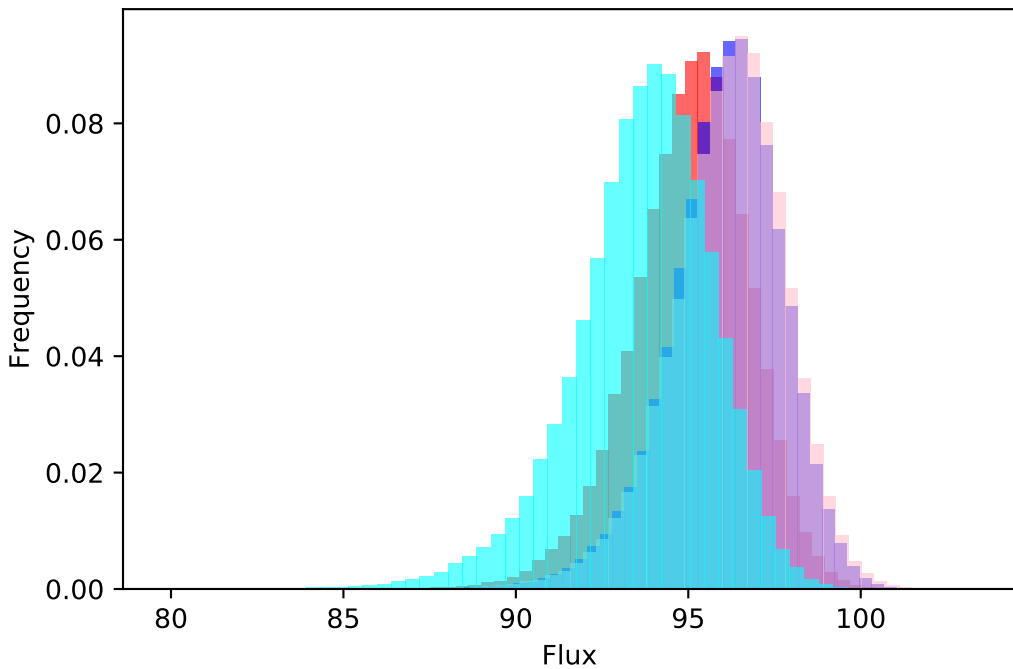
378 : CO2_c <=> CO2_m
['-']
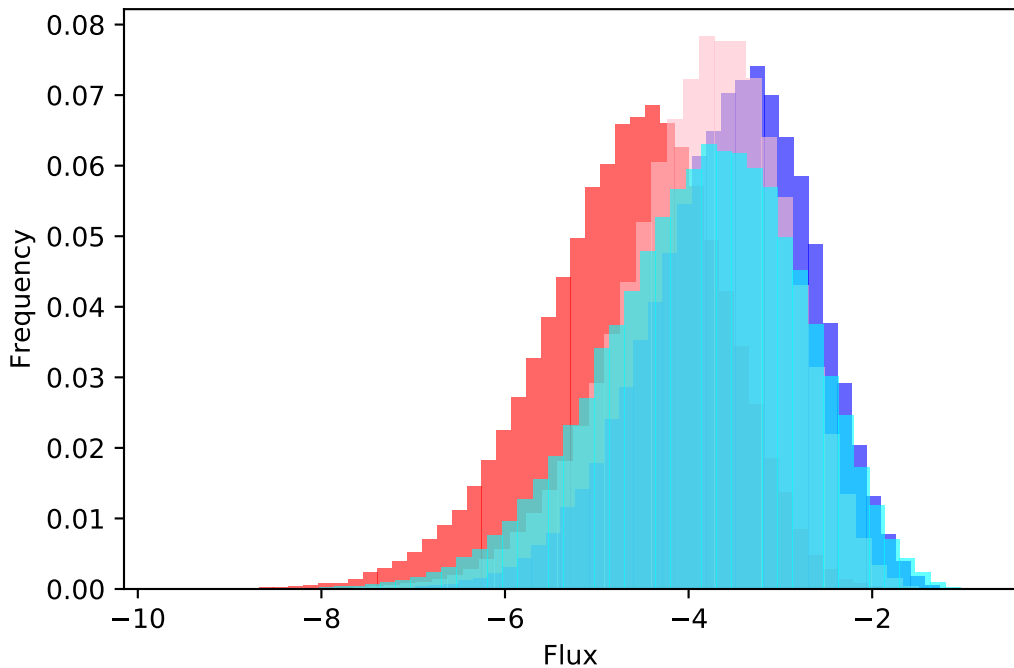
379 : H2O_c <=> H2O_h
['-']
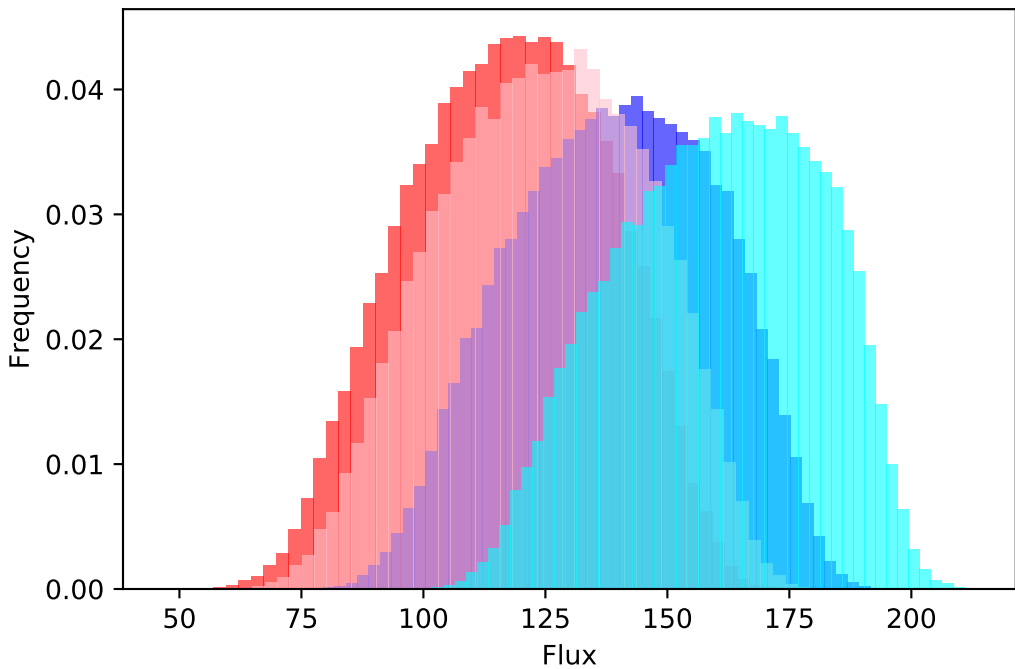
380 : H2O_c <=> H2O_m
['-']
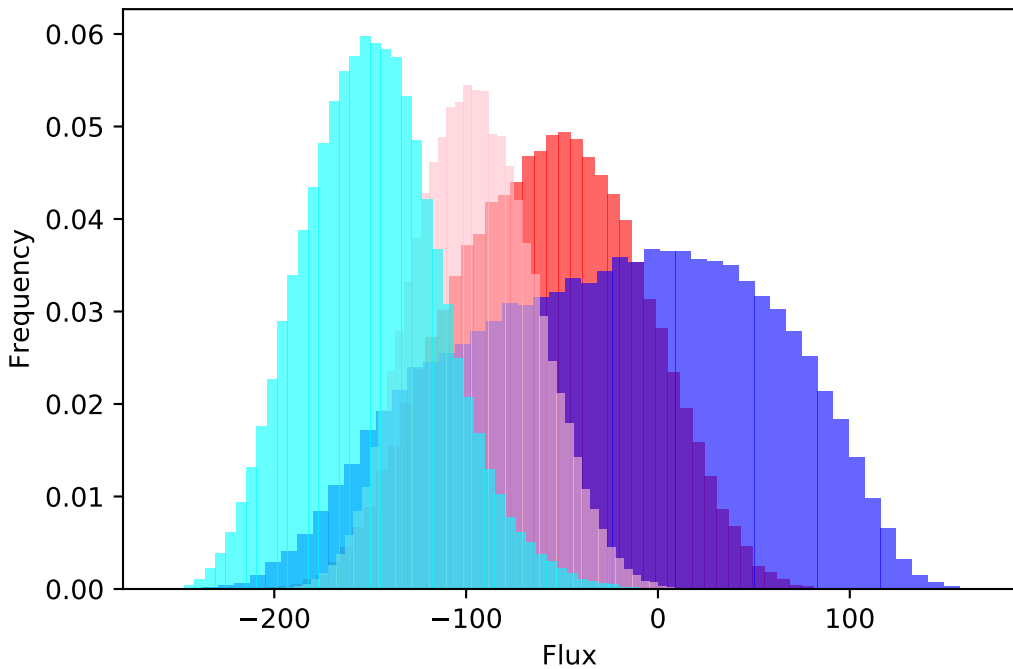
381 : H2O_c <=> H2O_p
['-']
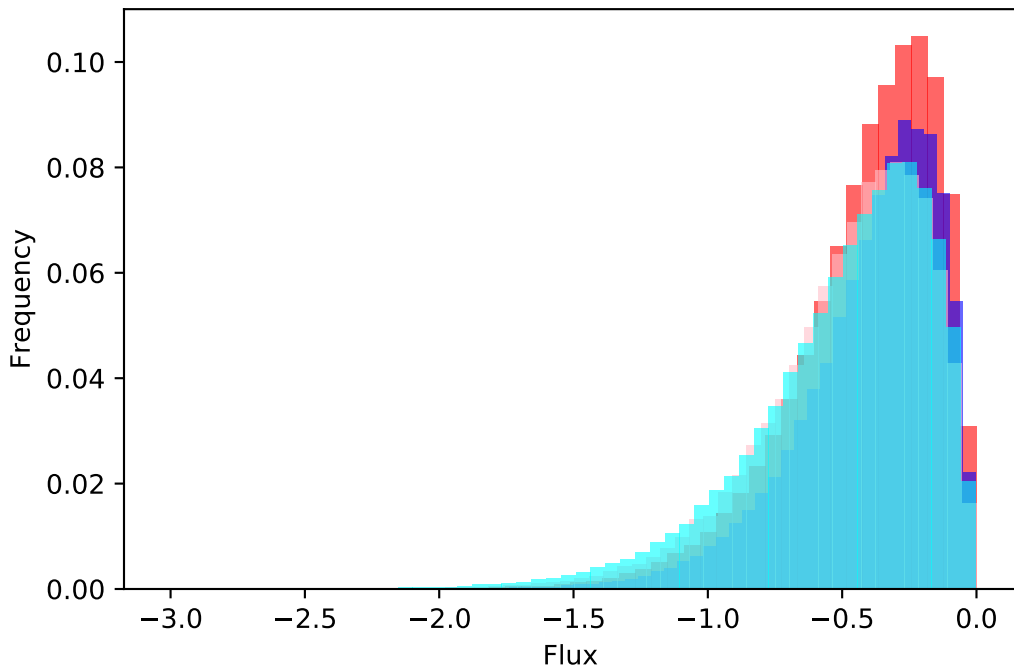
382 : H_c <=> H_p
['-']
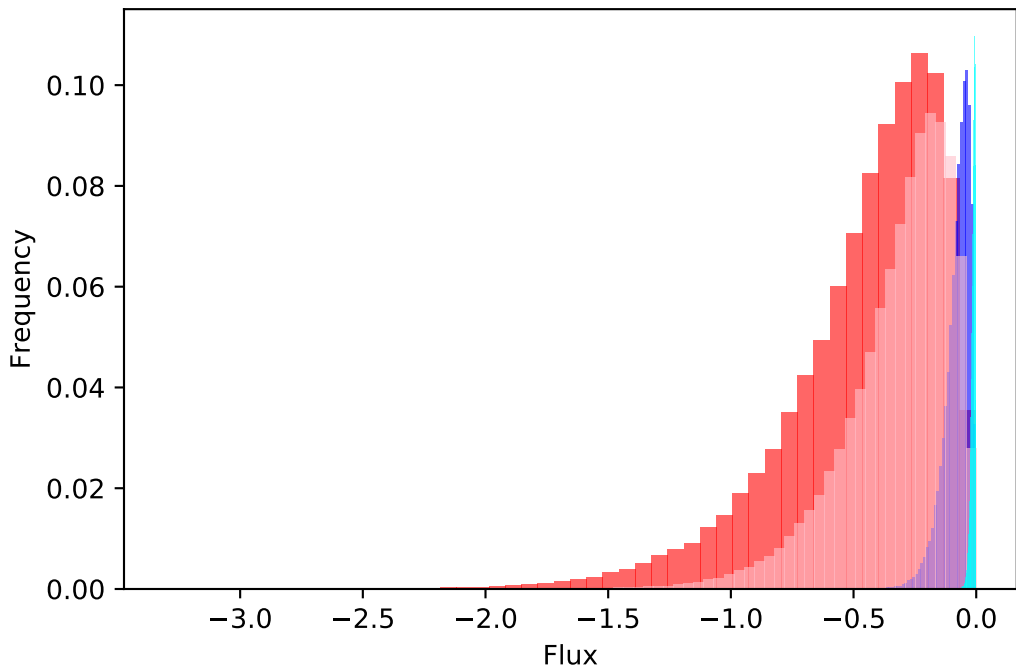
383 : NH4_c <=> NH4_h
['-']
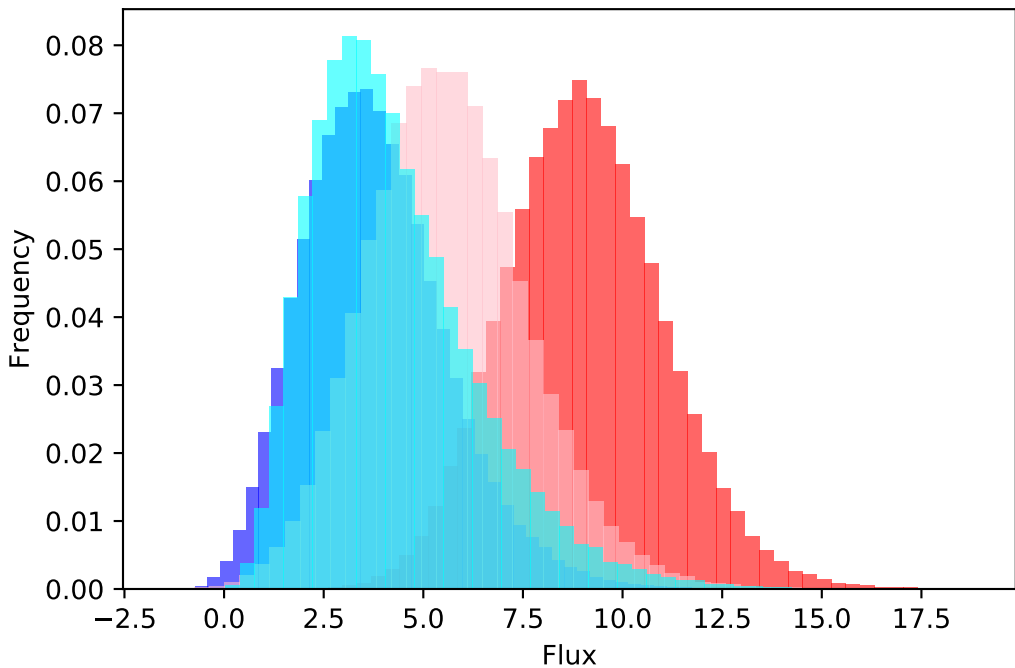
384 : NH4_c <=> NH4_m
['-']
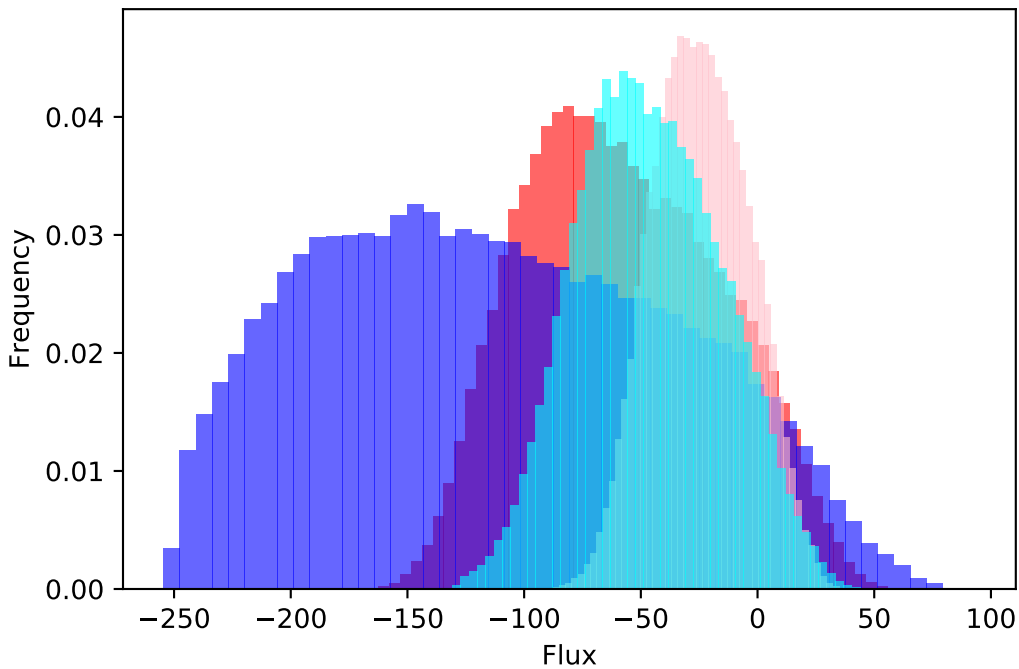
385 : H2S_c <=> H2S_h
['-']
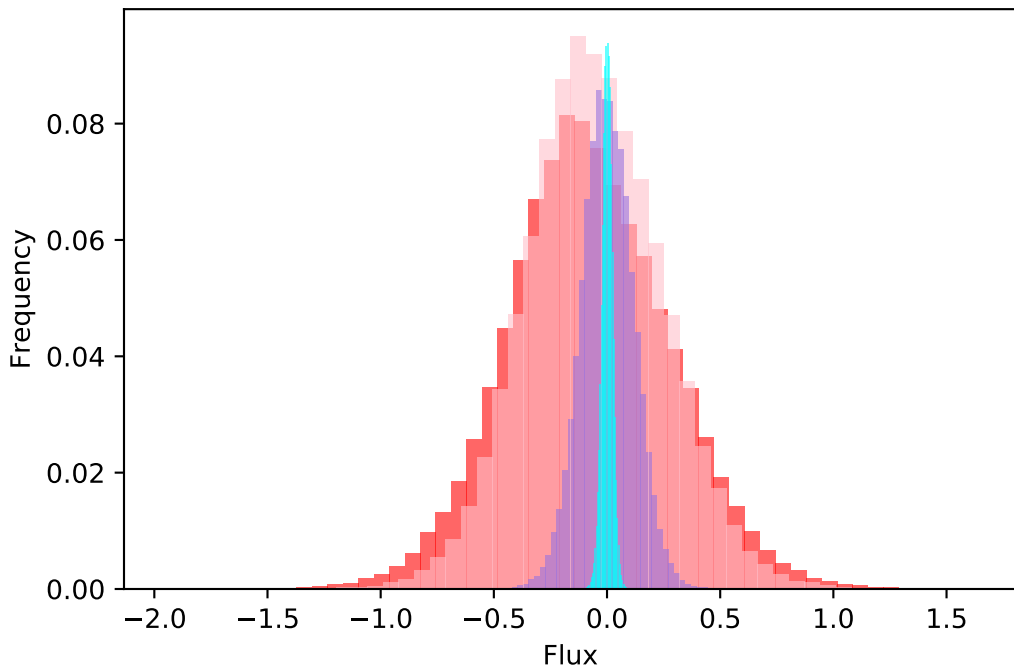
386 : H2S_c <=> H2S_m
['-']
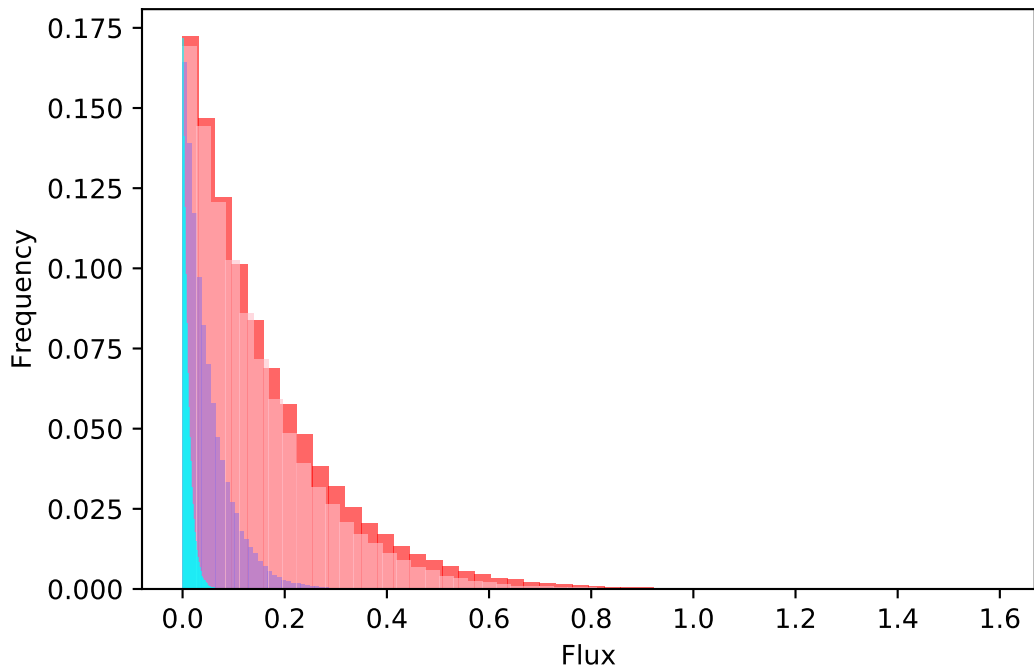
387 : AC_c <=> AC_h
['-']
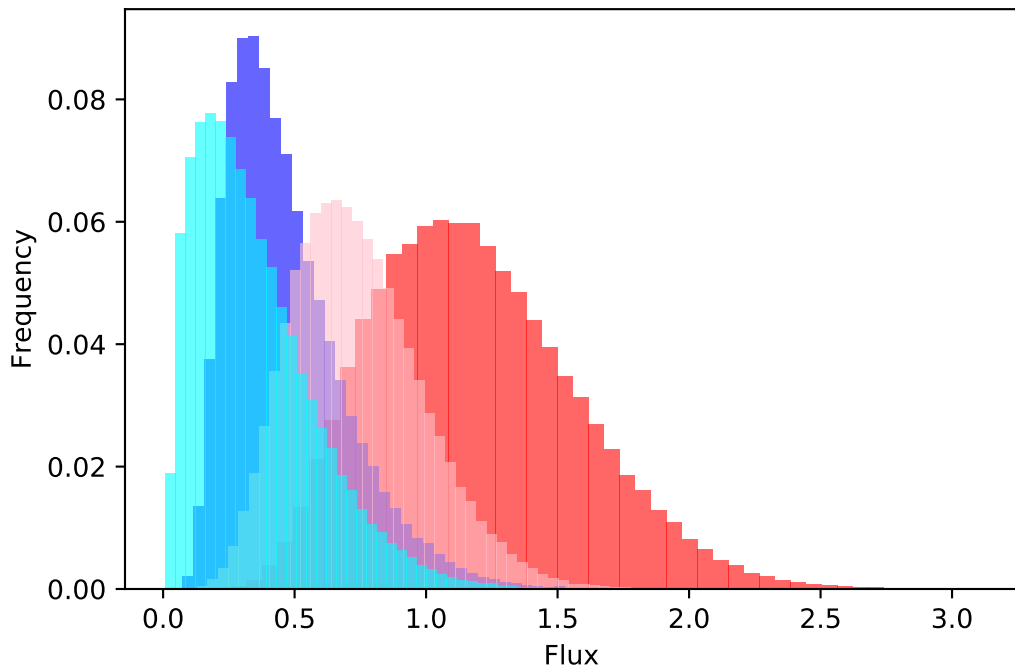
388 : AC_c <=> AC_m
['-']
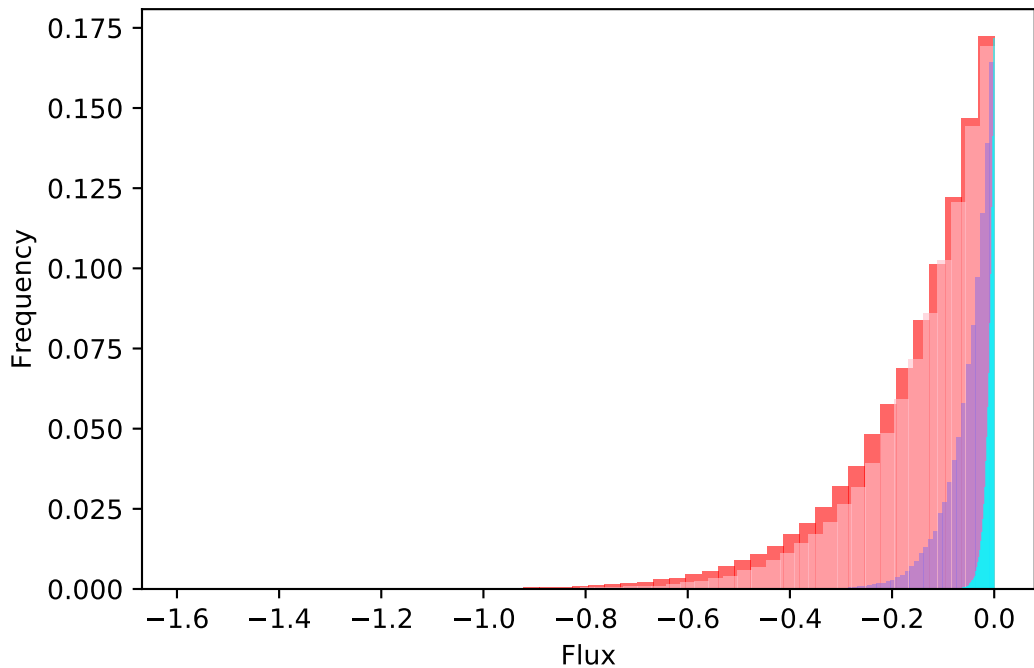
389 : Pyr_c <=> Pyr_h
['-']
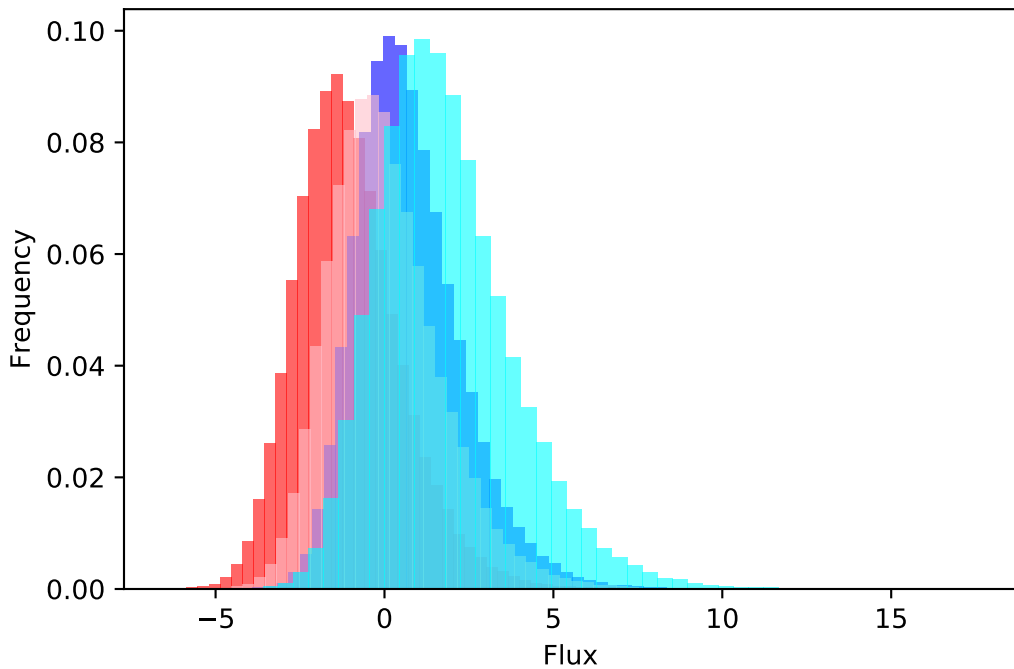
390 : Pyr_c <=> Pyr_m
['-']
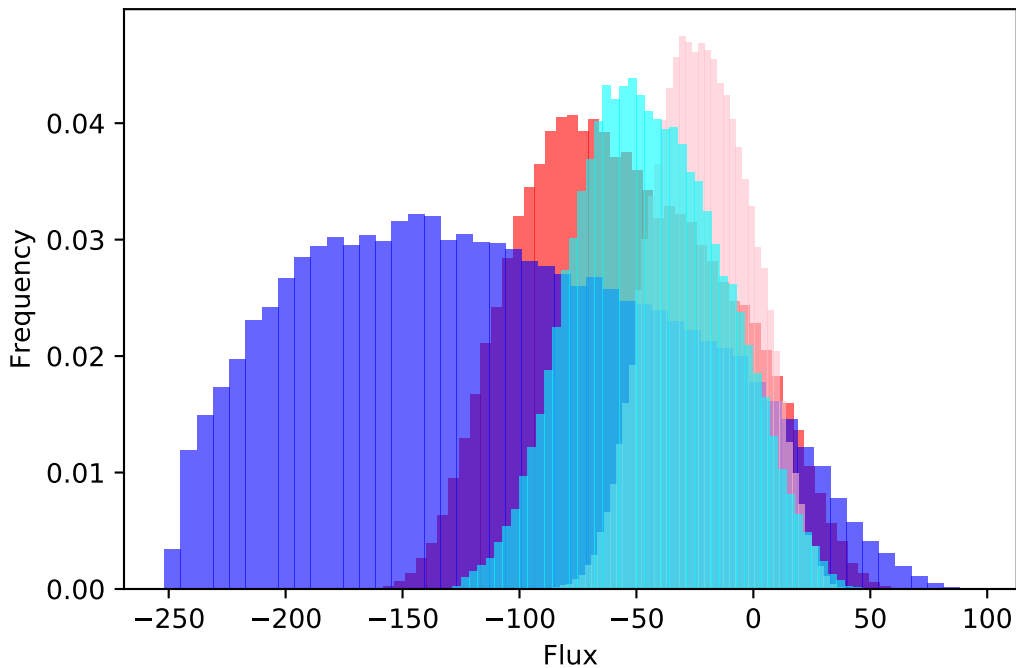
391 : Pyr_c <=> Pyr_p
['-']
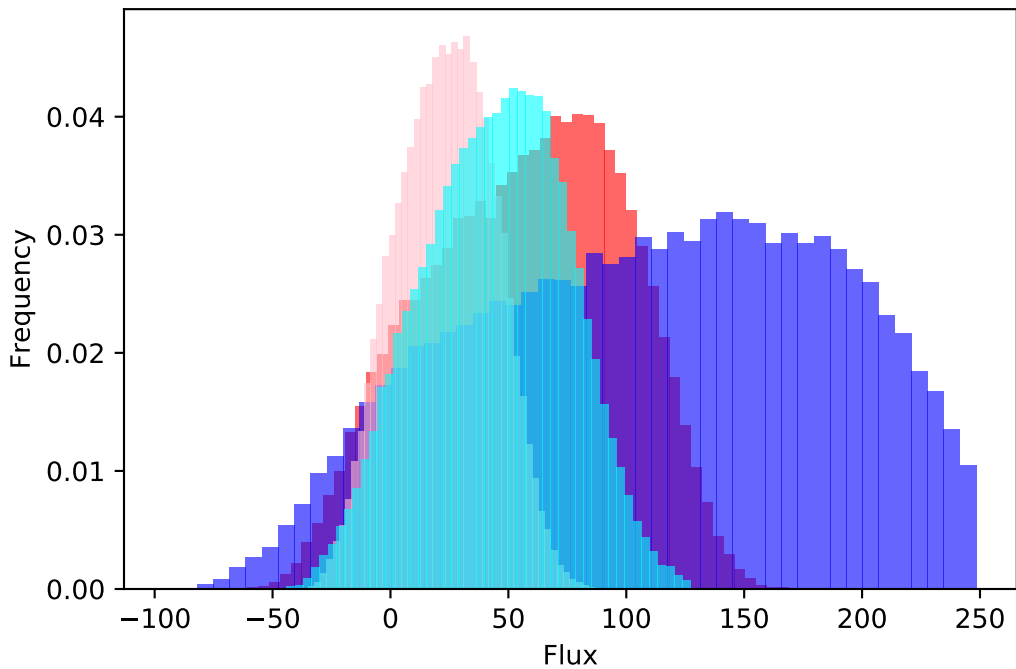
392 : GCA_c <=> GCA_p
['-']
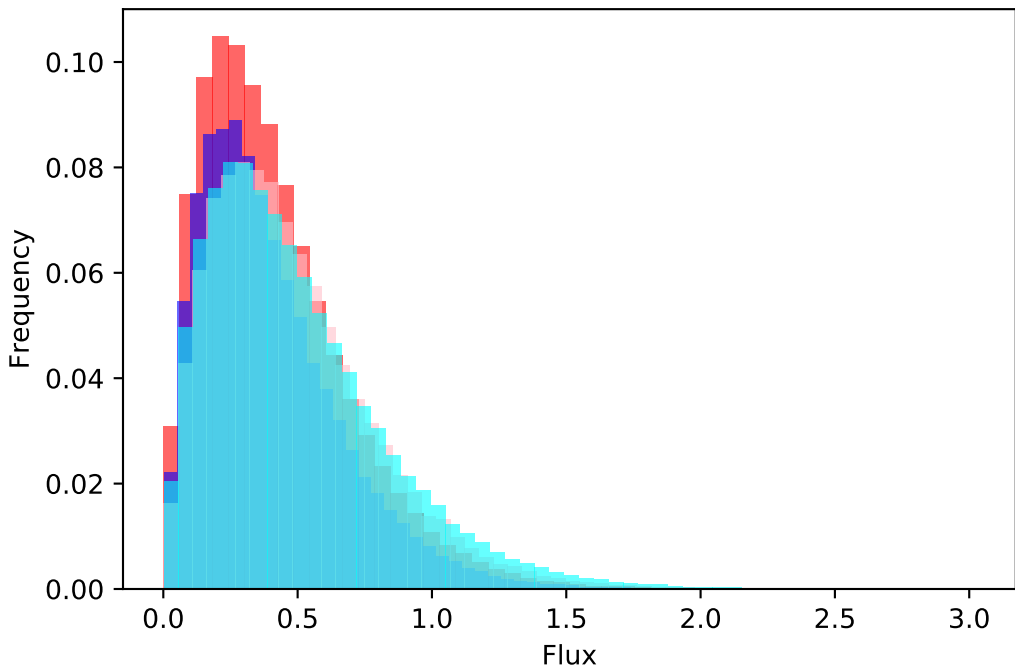
393 : GCEA_c <=> GCEA_p
['-']
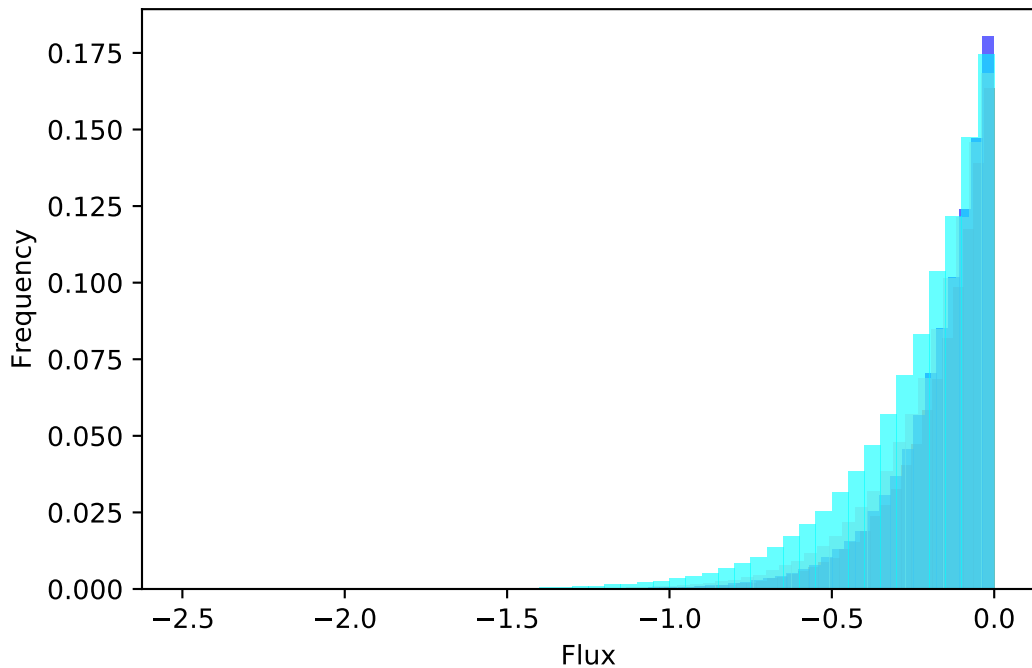
394 : Mal_c <=> Mal_p
['-']
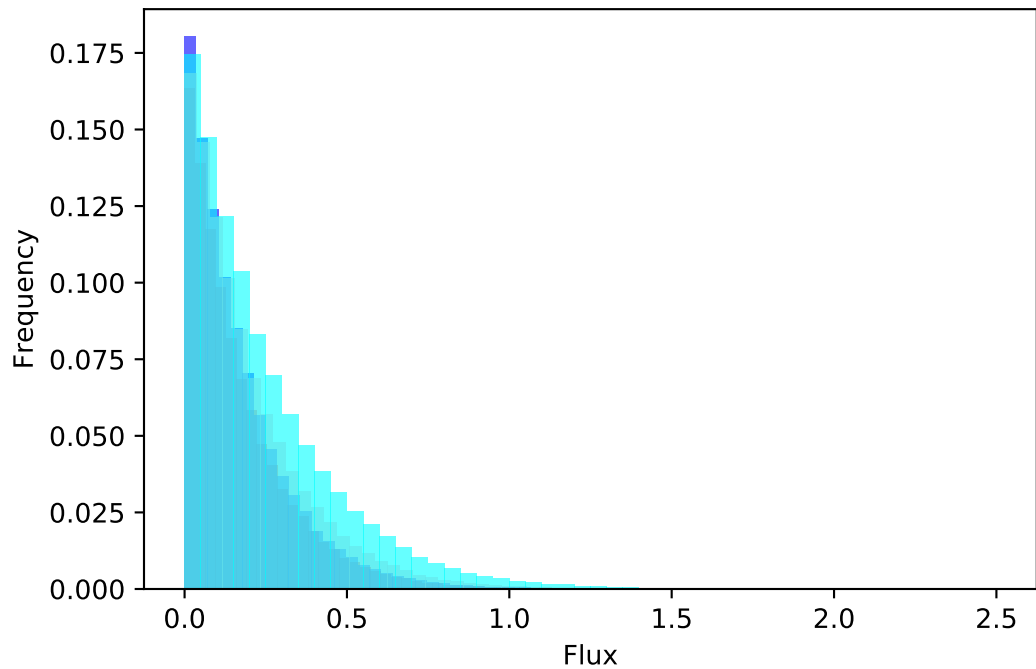
395 : OAA_c <=> OAA_p
['-']
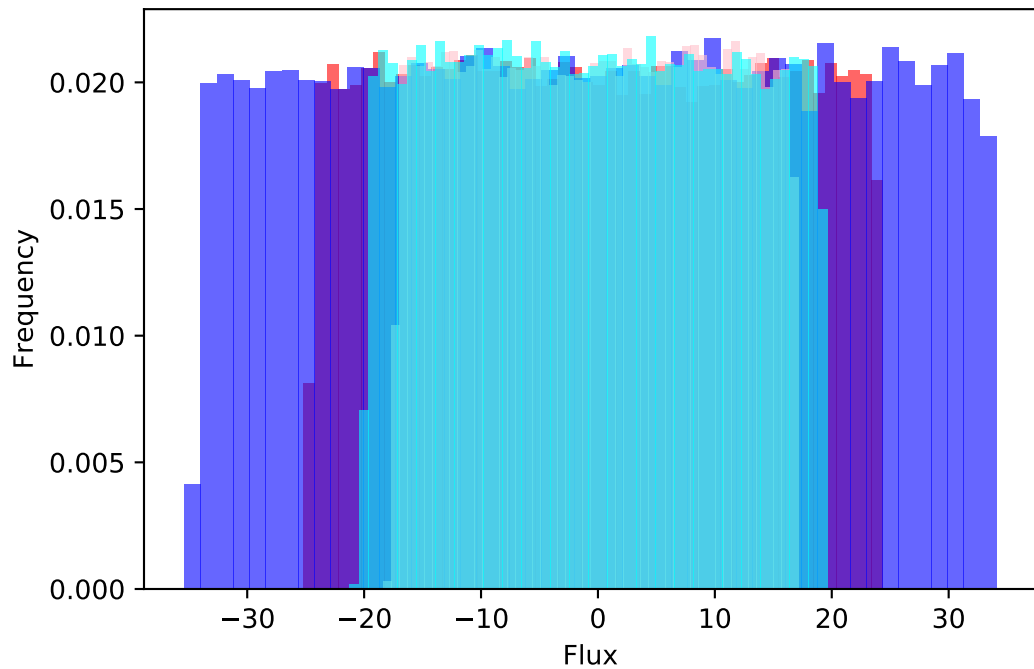
396 : KG_c <=> KG_p
['-']
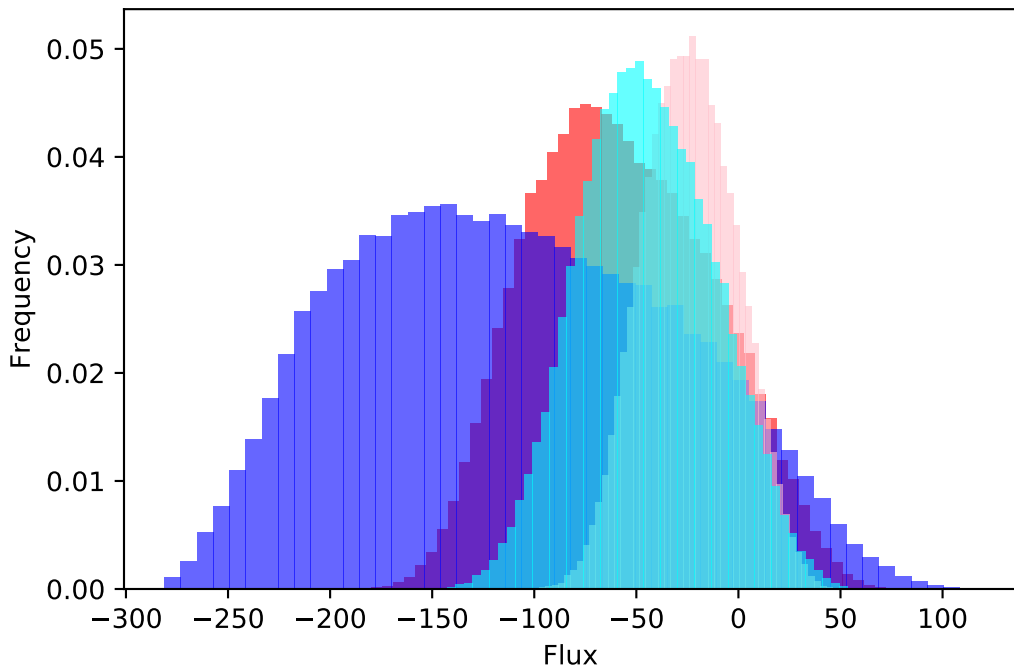
397 : Ala_c <=> Ala_p
['-']
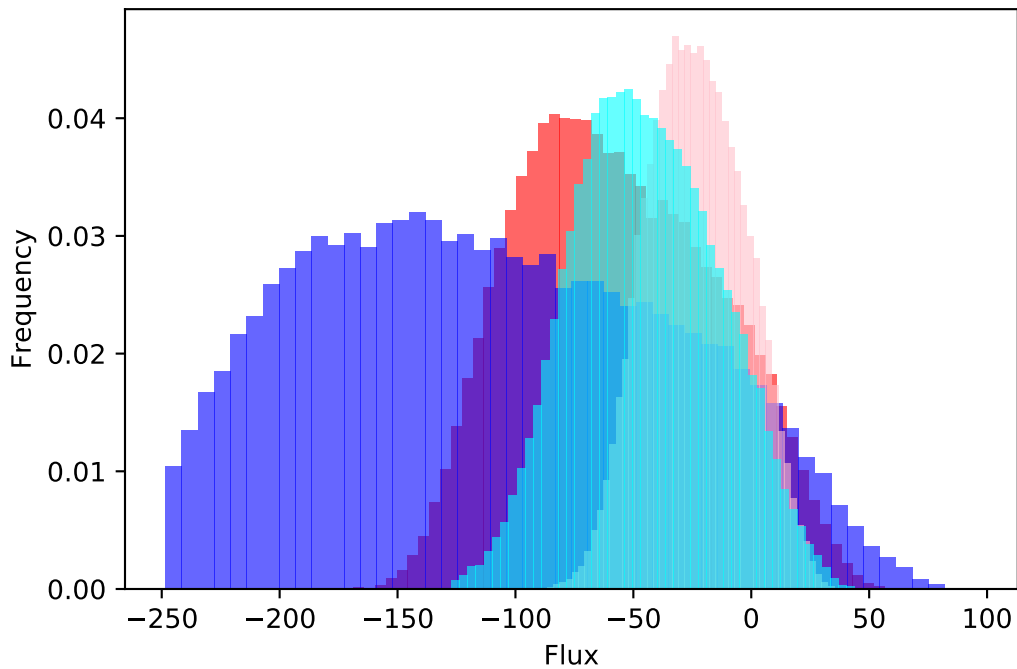
398 : Arg_c <=> Arg_p
['-']
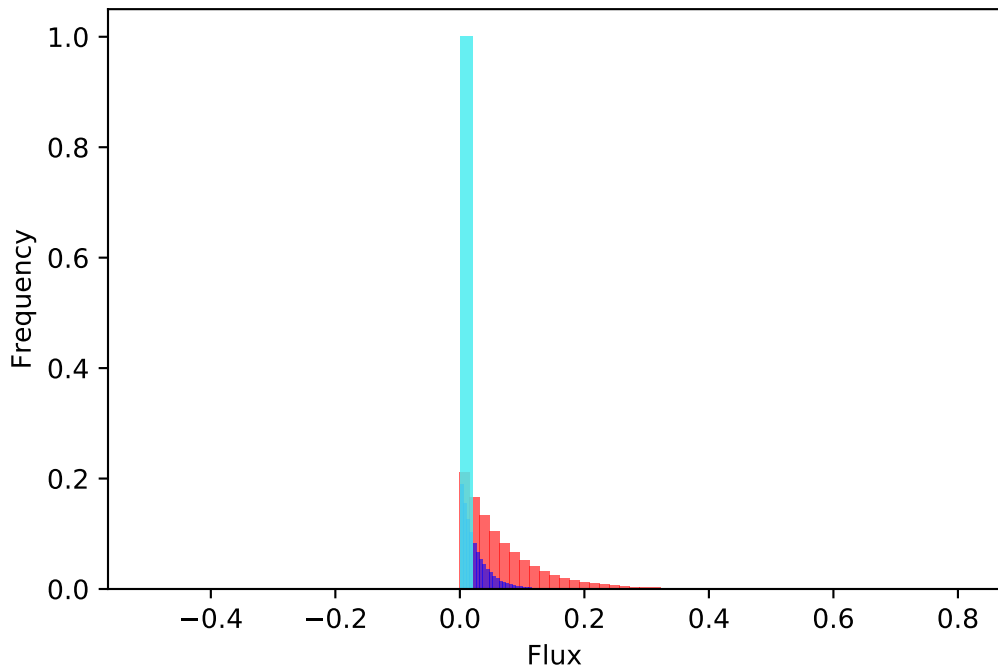
399 : Asn_c <=> Asn_p + H_p
['-']
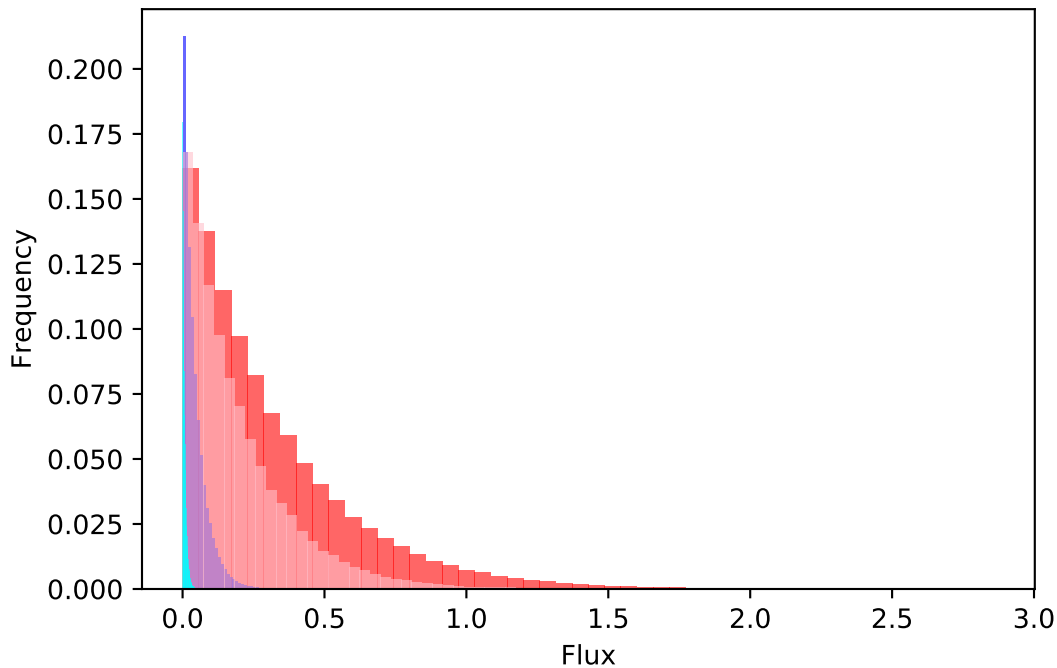
400 : Asp_c <=> Asp_p
['-']
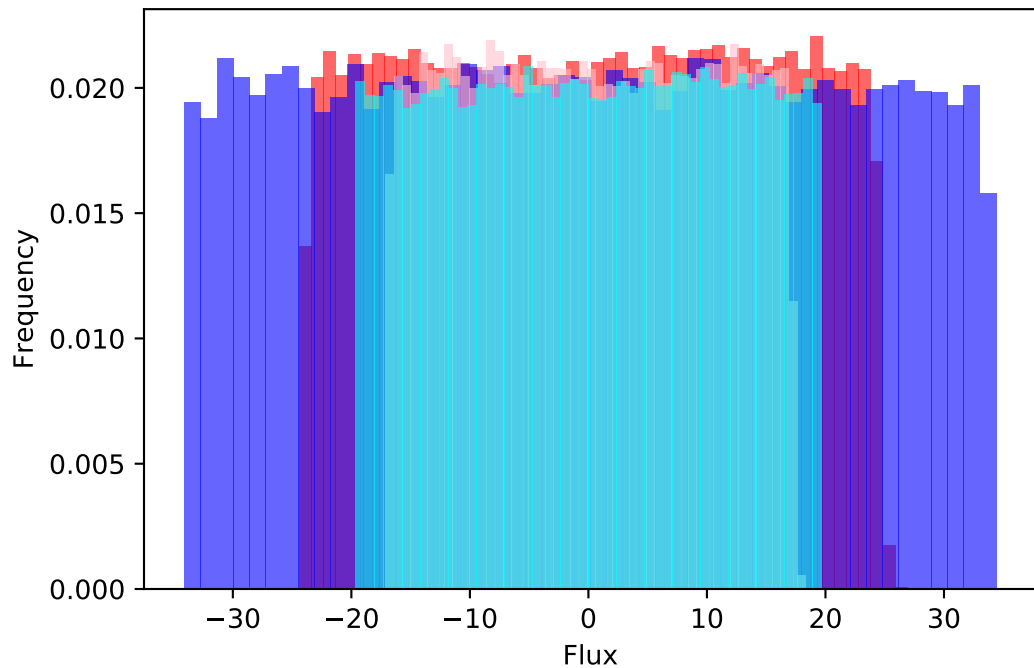
401 : Cys_c <=> Cys_p
['-']
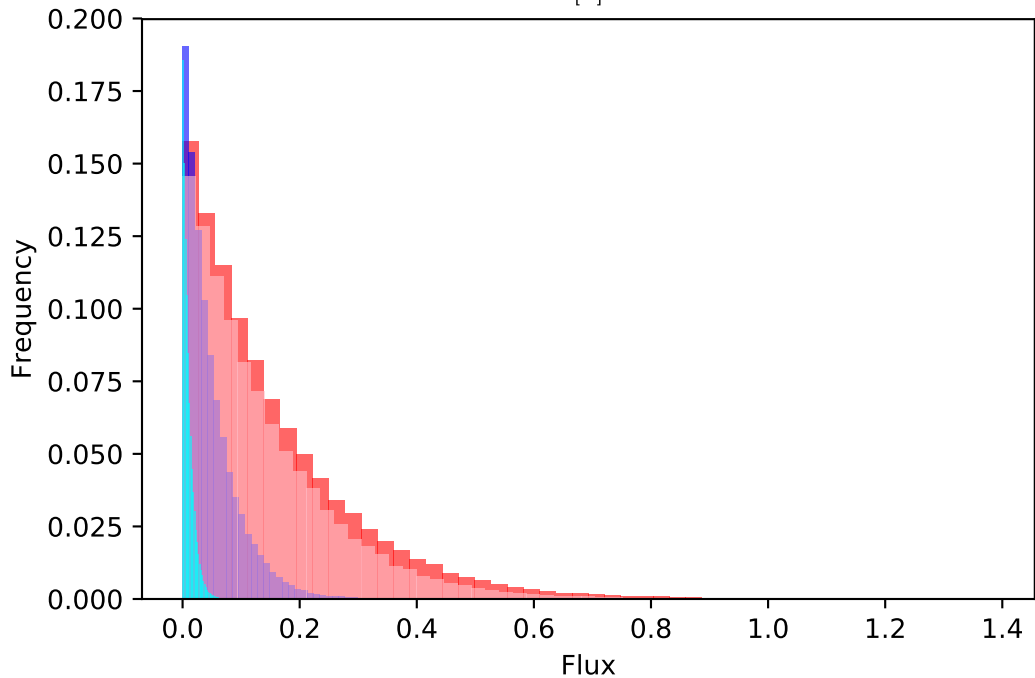
402 : Glu_c <=> Glu_p
['-']
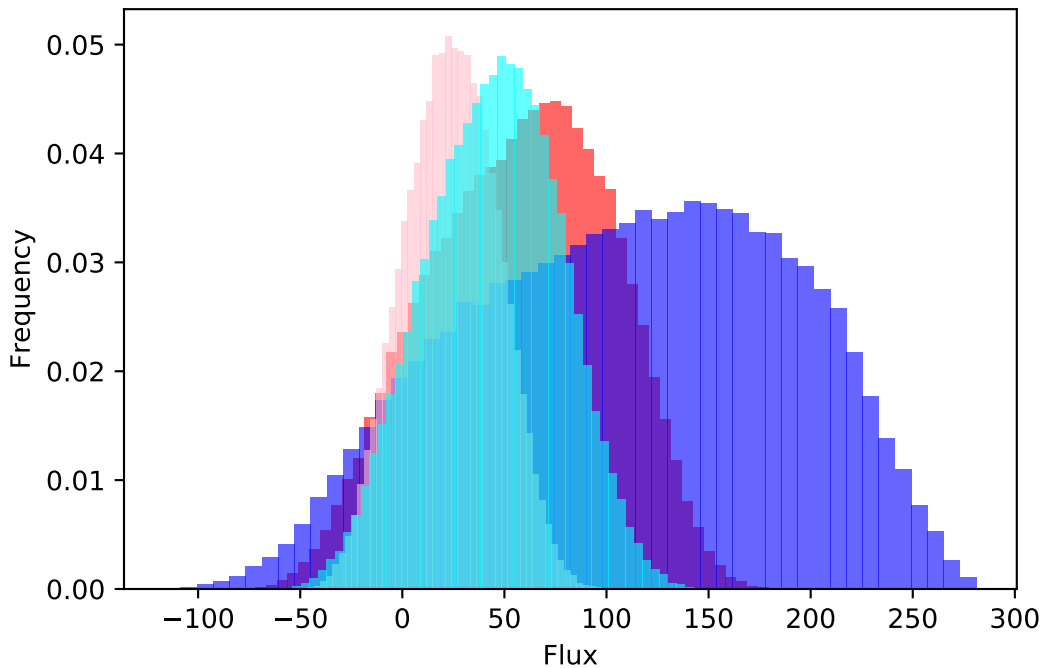
403 : Gln_c <=> Gln_p + H_p
['-']
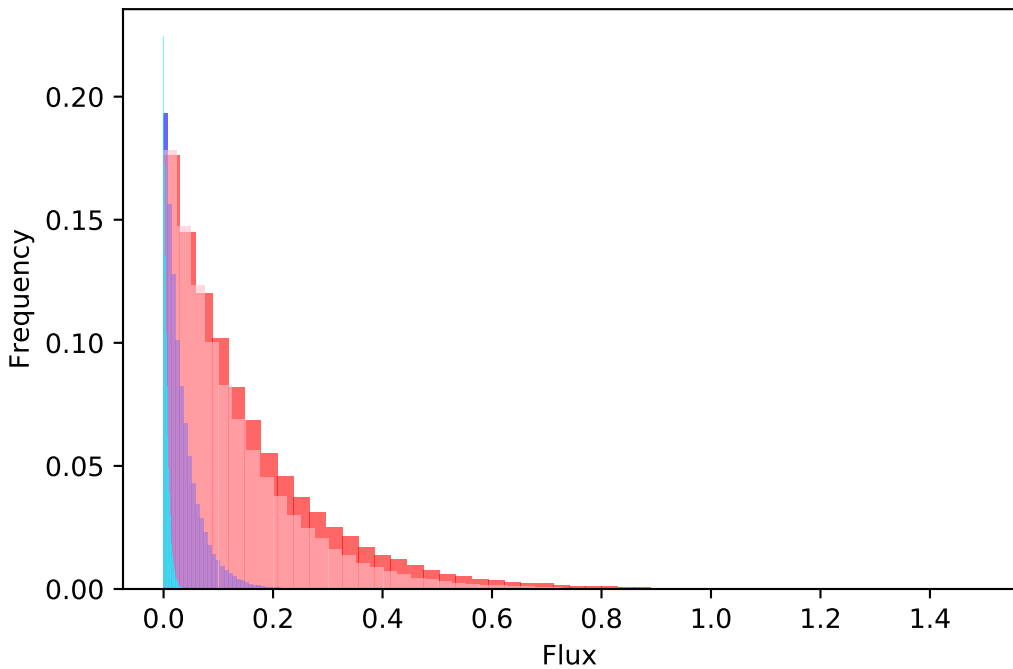
404 : Gly_c <=> Gly_p
['-']
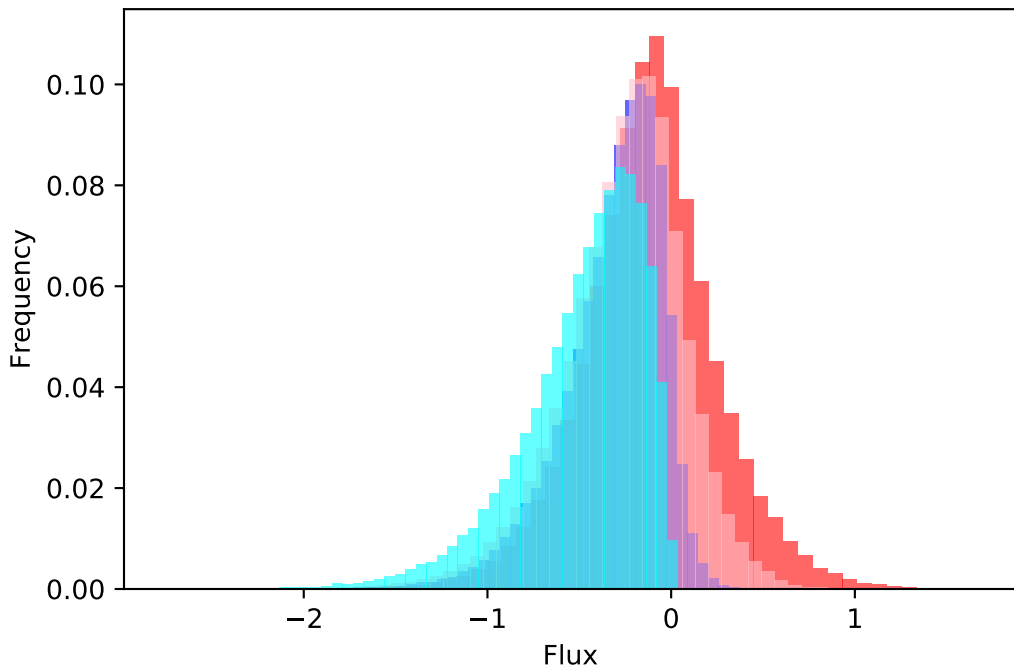
405 : His_c <=> His_p
['-']
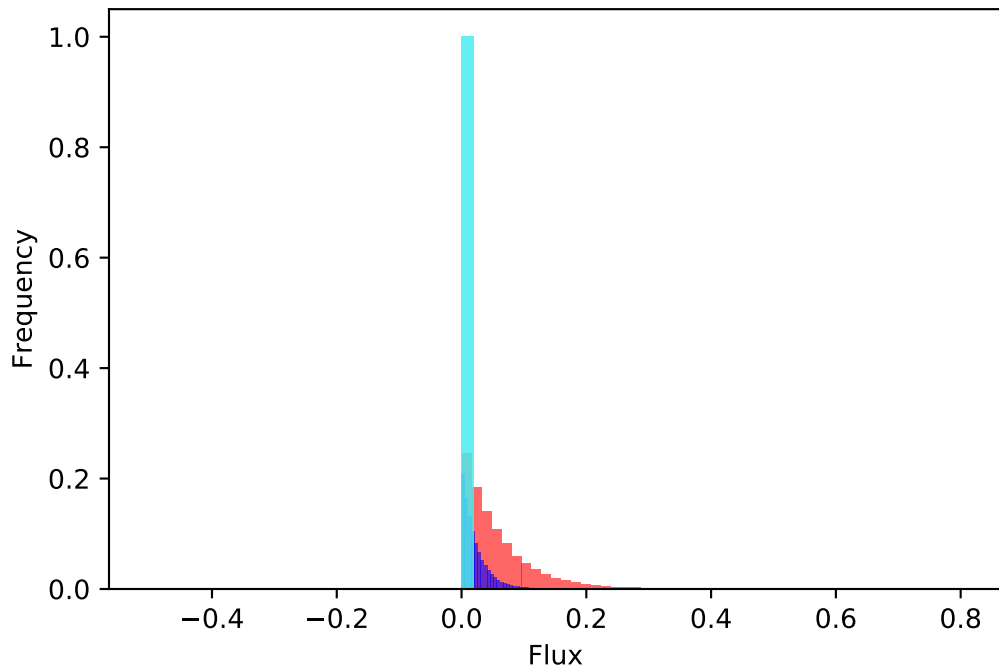
406 : Ile_c <=> Ile_p
['-']
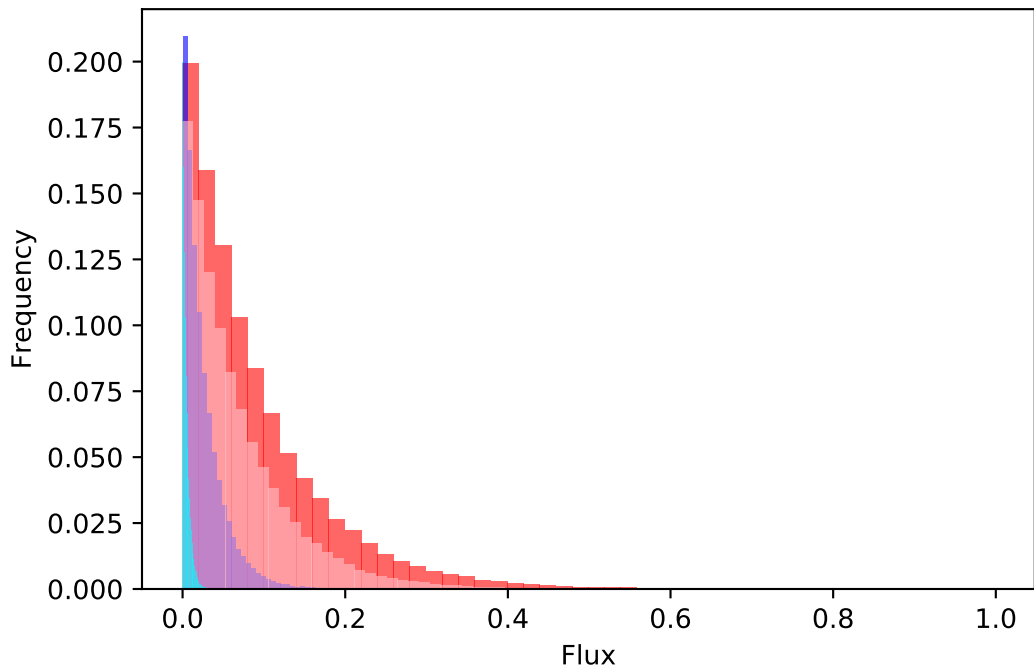
407 : Leu_c <=> Leu_p
['-']
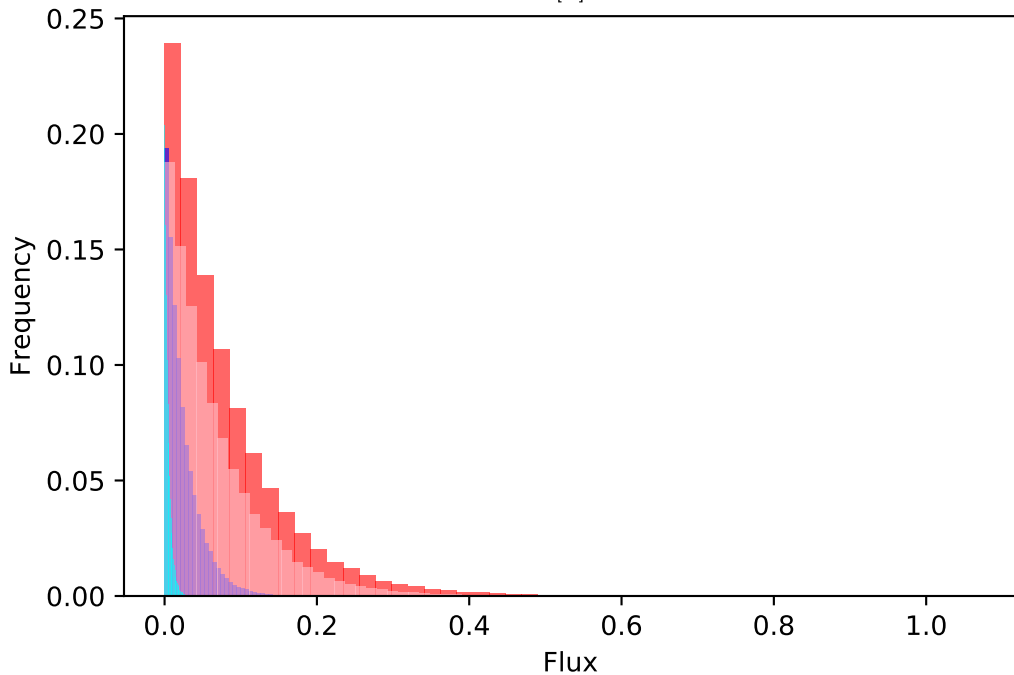
408 : Lys_c <=> Lys_p
['-']
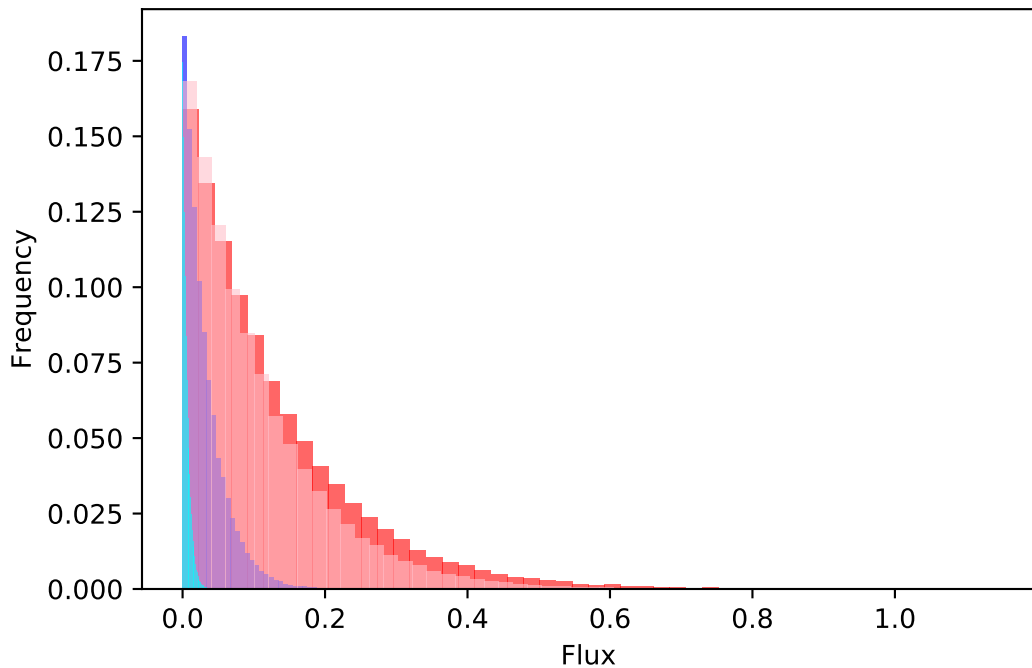
409 : Met_c <=> Met_p
['-']
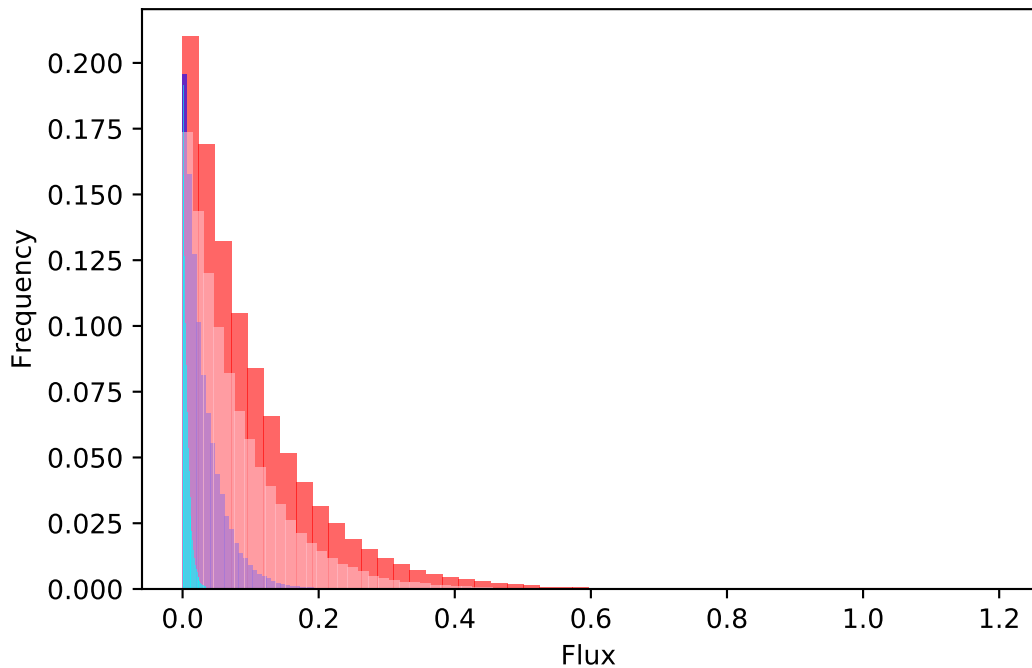
410 : Phe_c <=> Phe_p
['-']
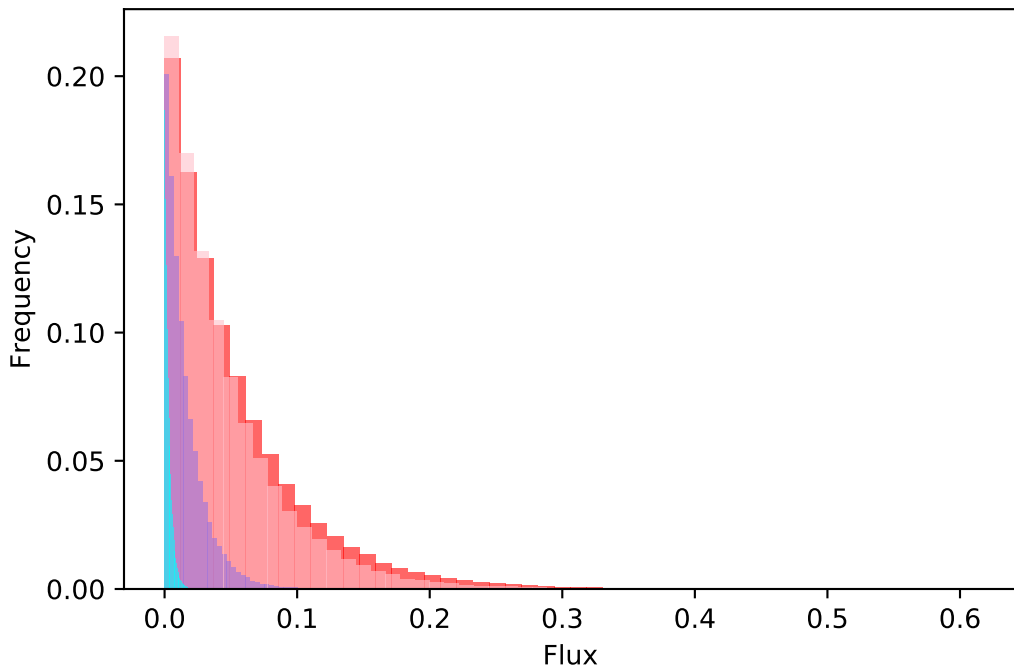
411 : Pro_c <=> Pro_p
['-']
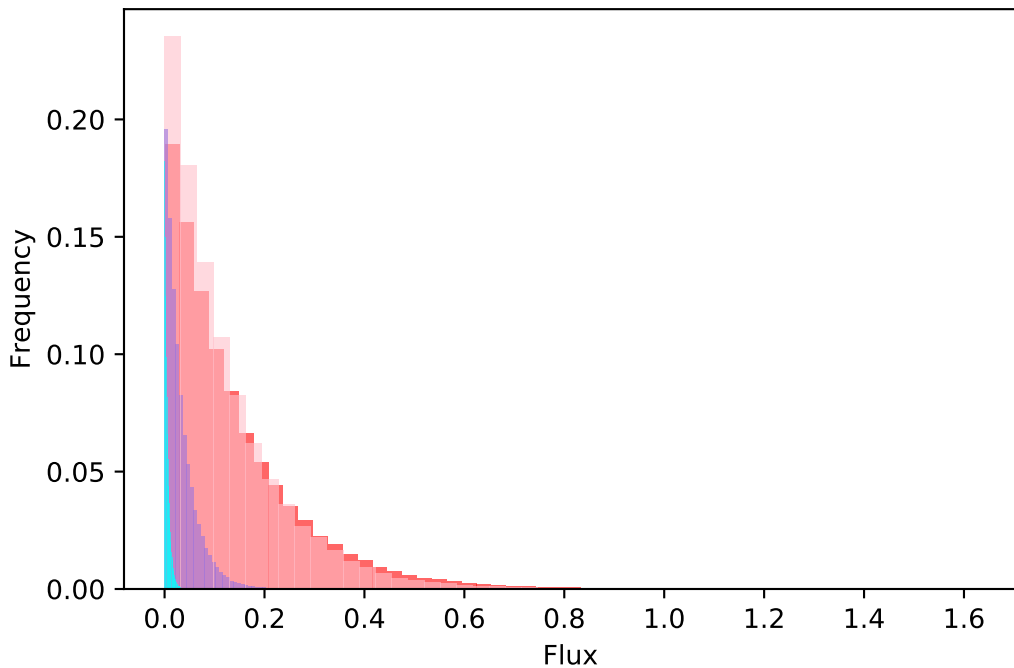
412 : Ser_c <=> Ser_p
['-']
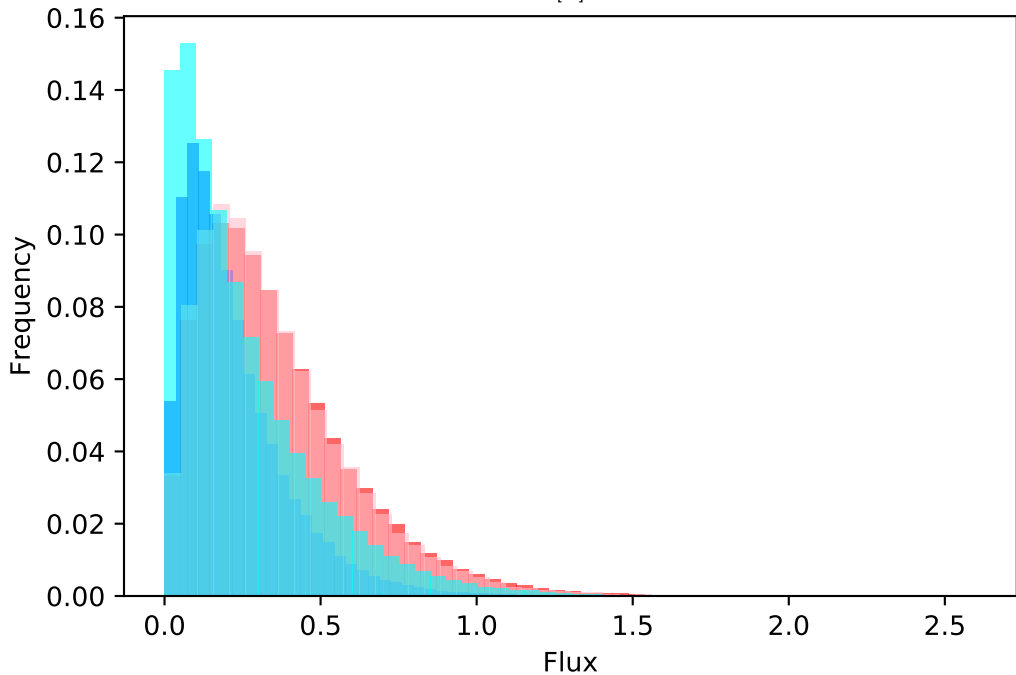
413 : Thr_c <=> Thr_p
['-']
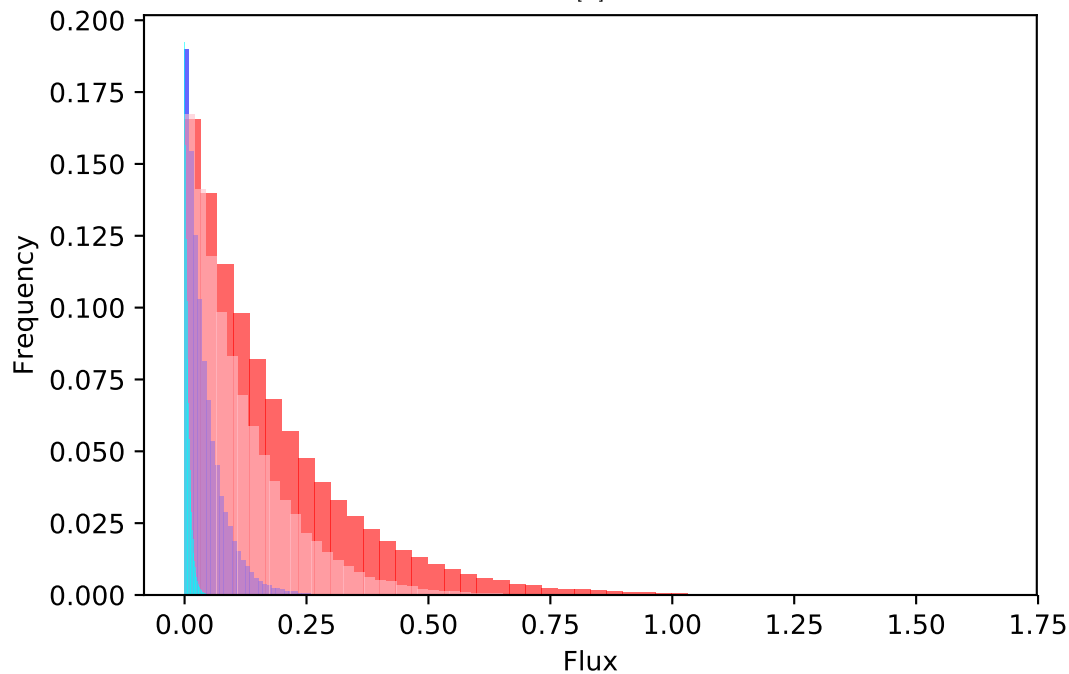
414 : Trp_c <=> Trp_p
['-']
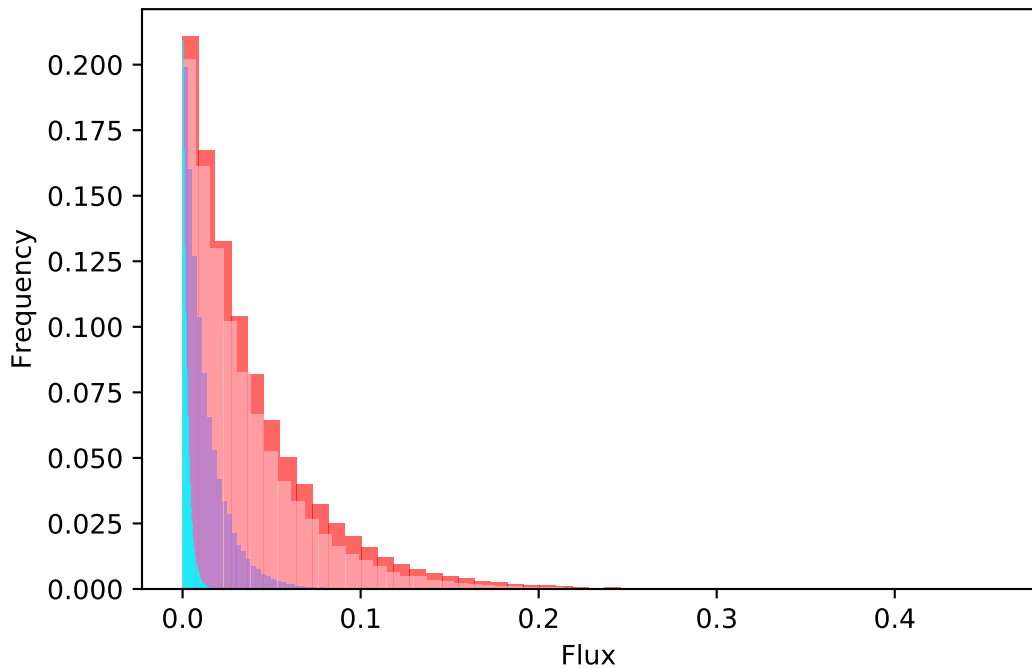
415 : Tyr_c <=> Tyr_p
['-']
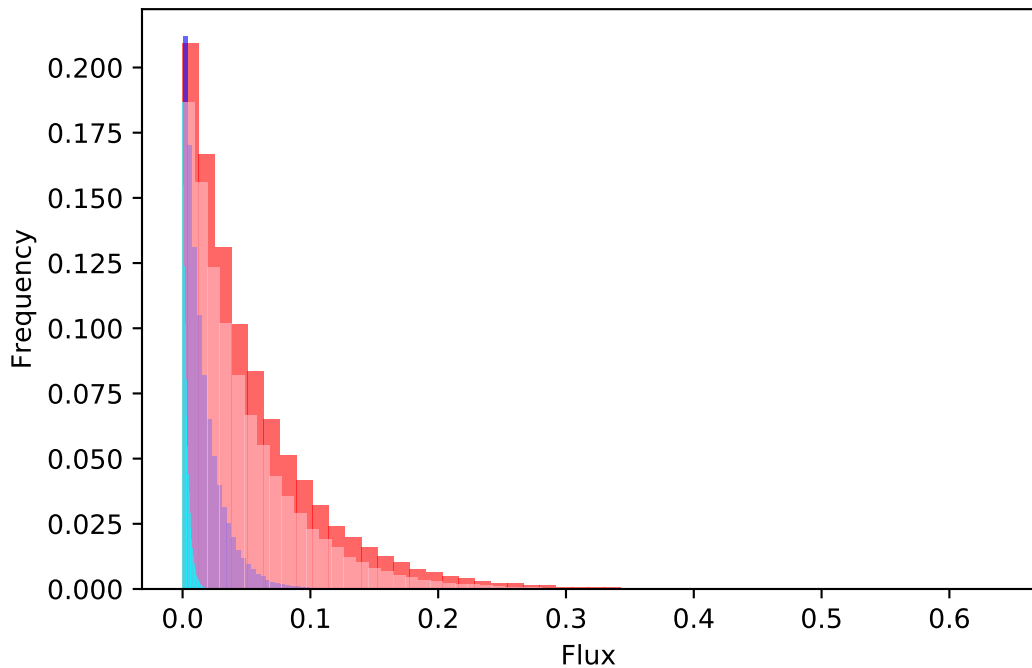
416 : Val_c <=> Val_p
['-']
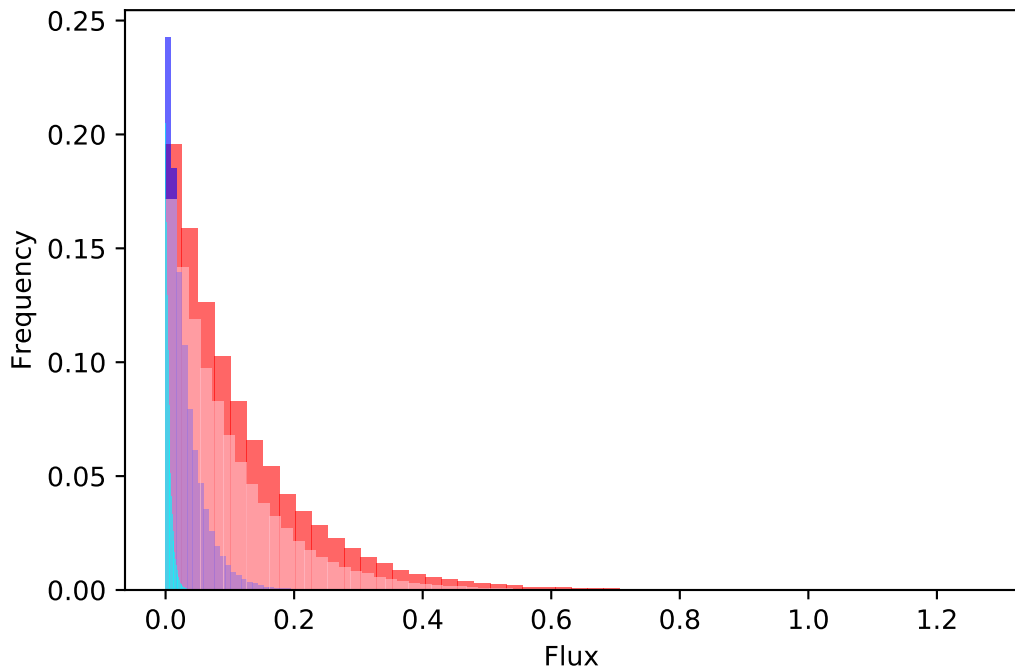
417 : Ala_h --> Ala_c
['-']
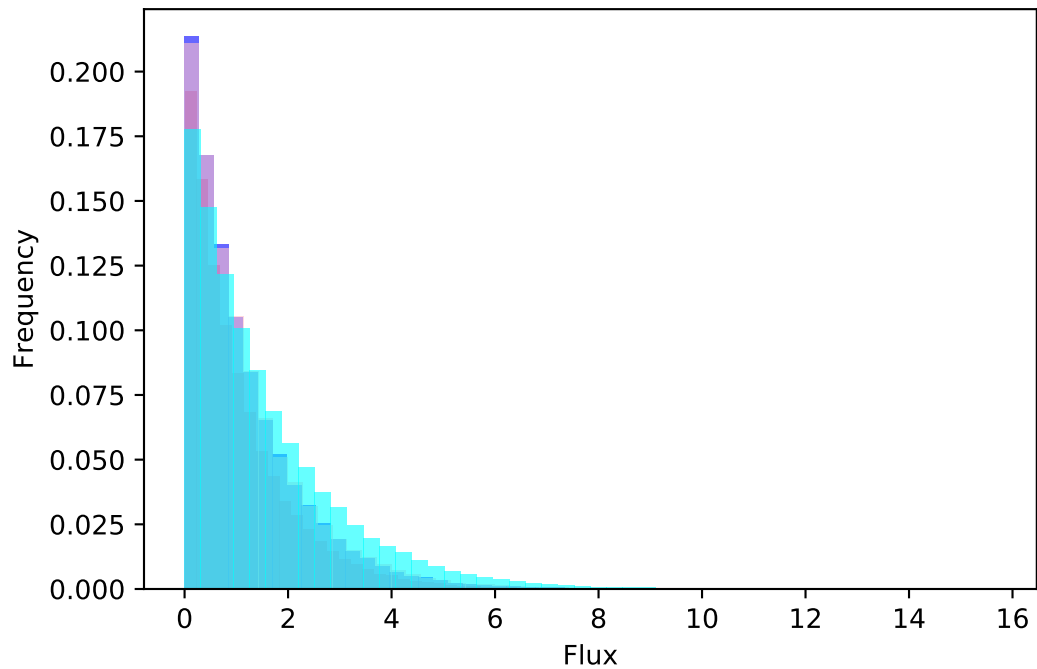
418 : Arg_h --> Arg_c
['-']
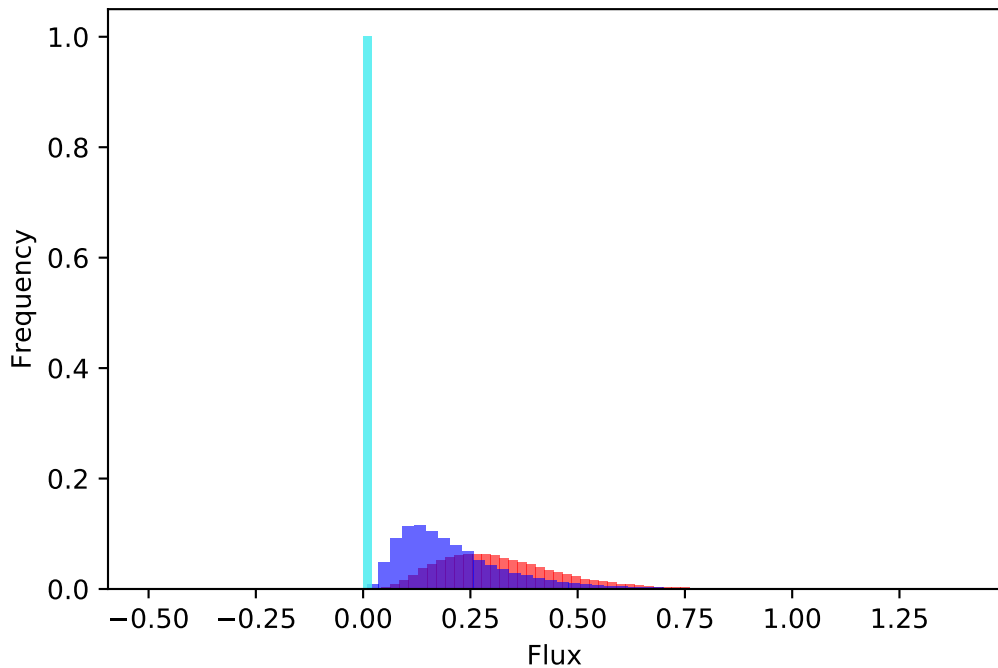
419 : Asn_c --> Asn_h + H_h
['-']
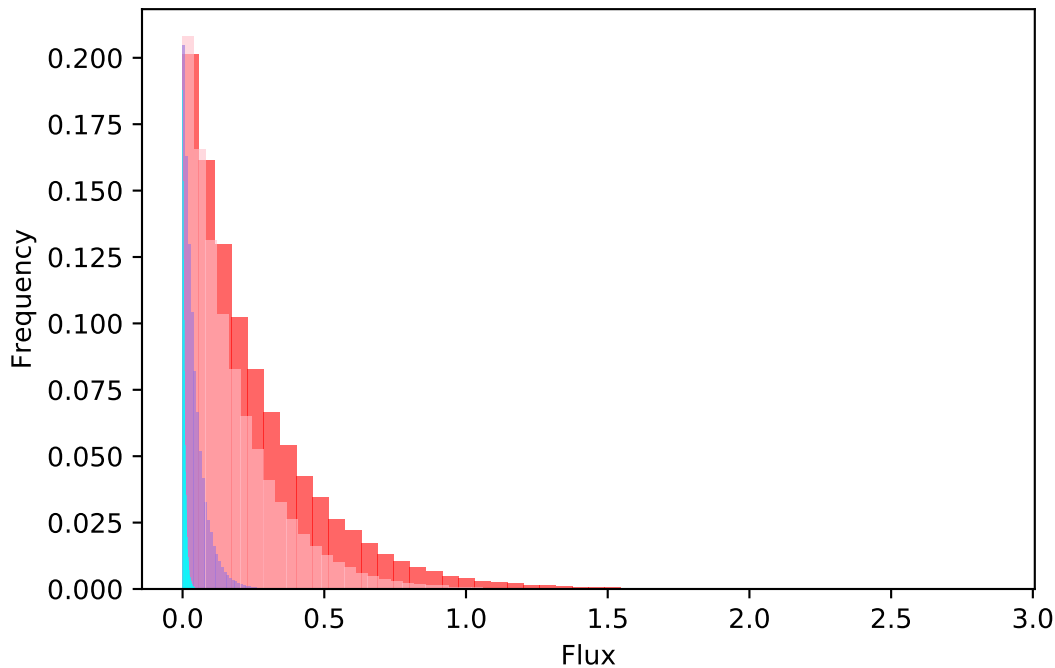
420 : Asn_c --> Asn_m
['-']
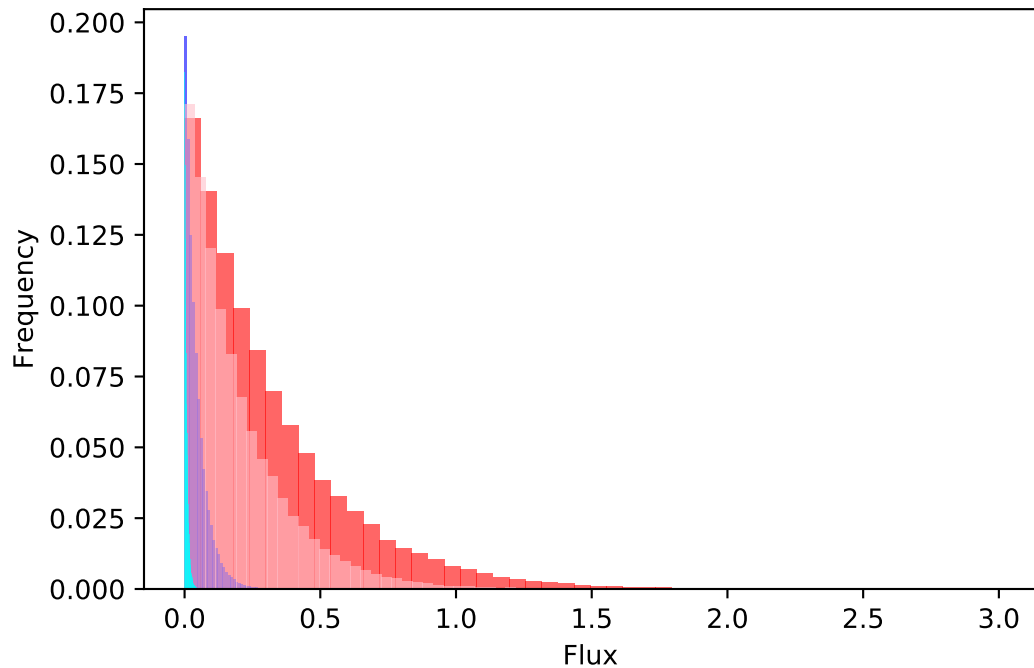
421 : Glu_c --> Glu_h
['-']
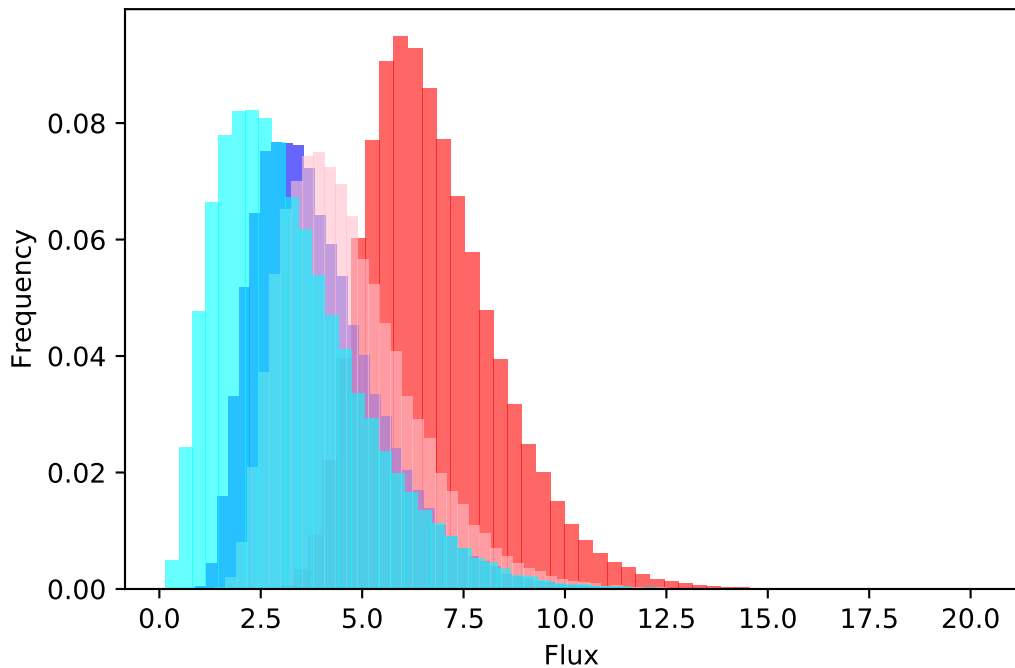
422 : His_h --> His_c
['-']
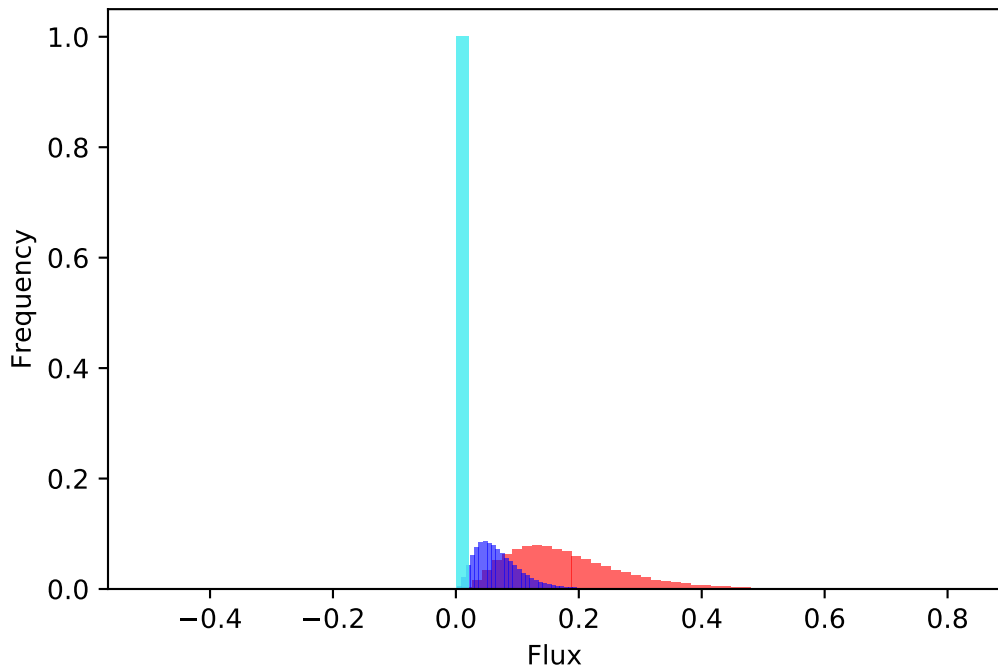
423 : His_c --> His_m
['-']
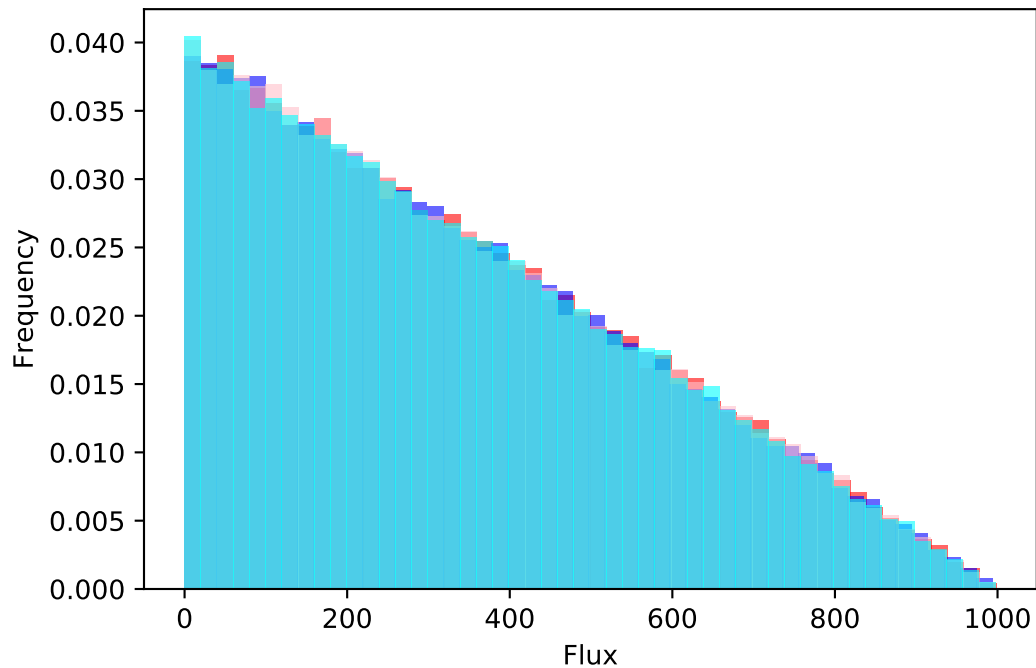
424 : Ile_h --> Ile_c
['-']
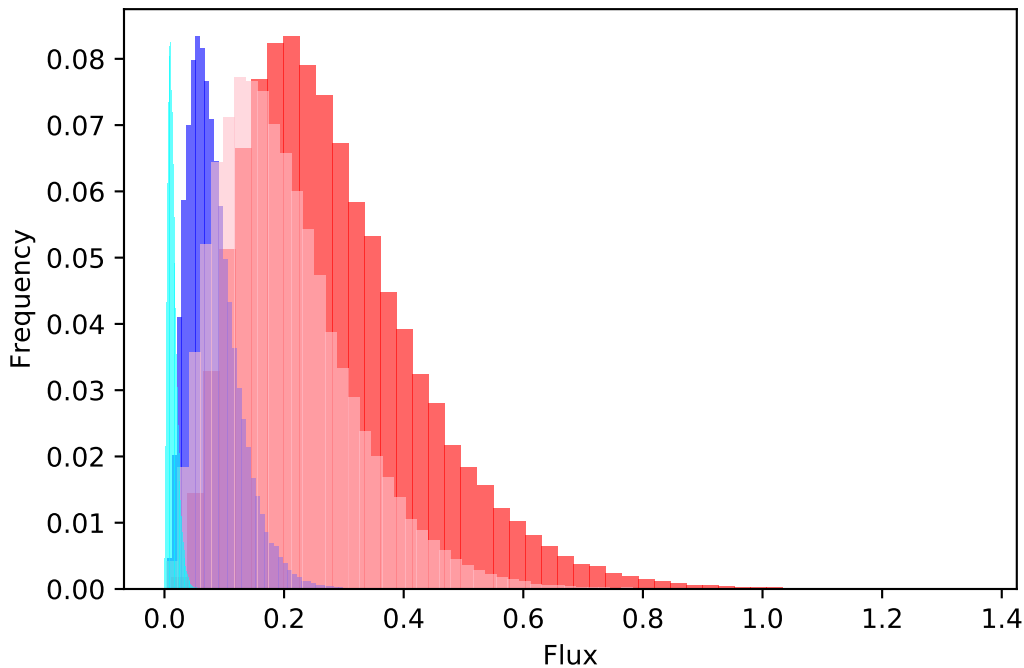
425 : Ile_c --> Ile_m
['-']
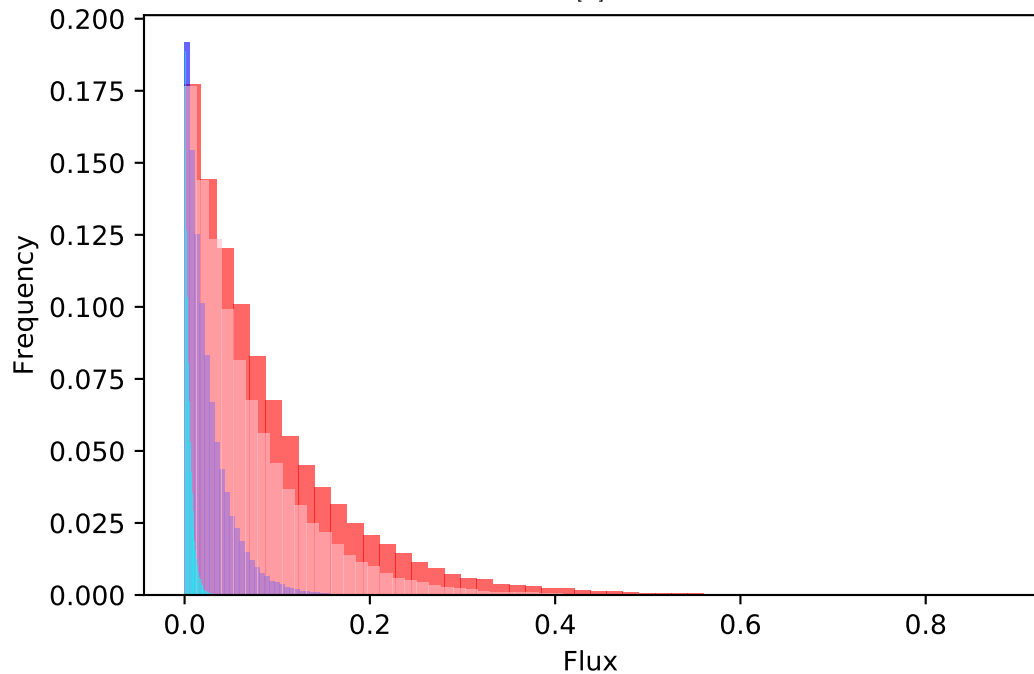
426 : Leu_h --> Leu_c
['-']
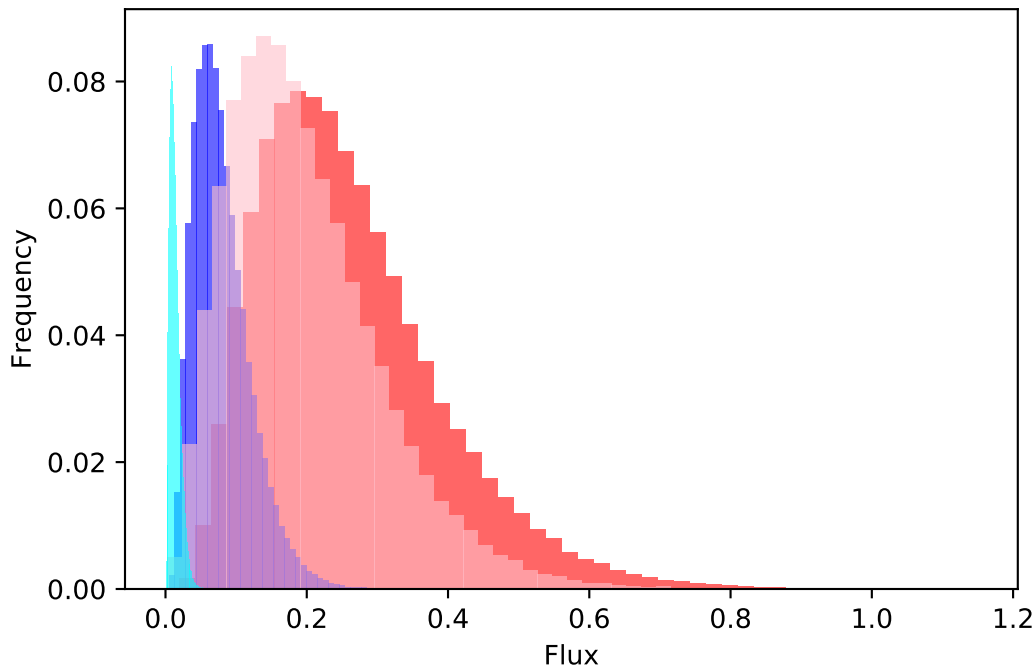
427 : Leu_c --> Leu_m
['-']
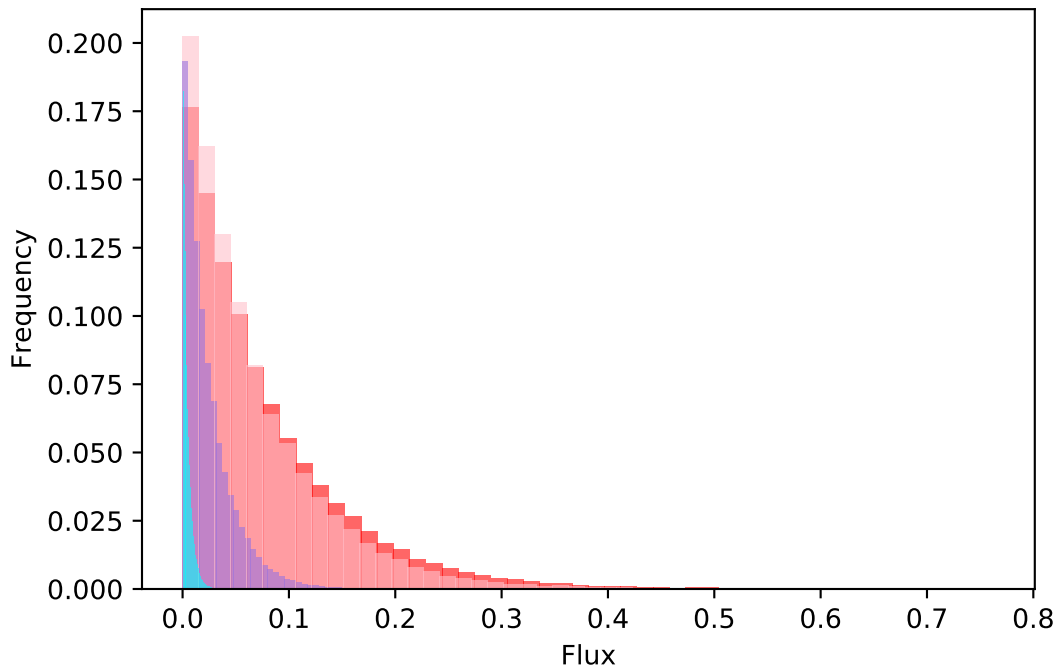
428 : Lys_h --> Lys_c
['-']
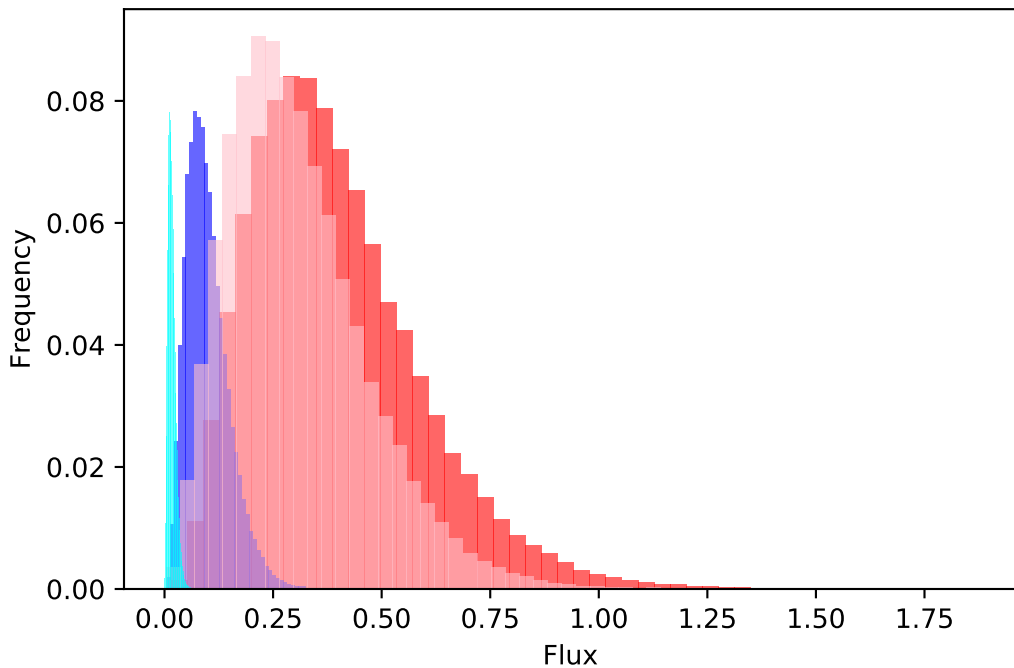
429 : Met_c --> Met_h
['-']
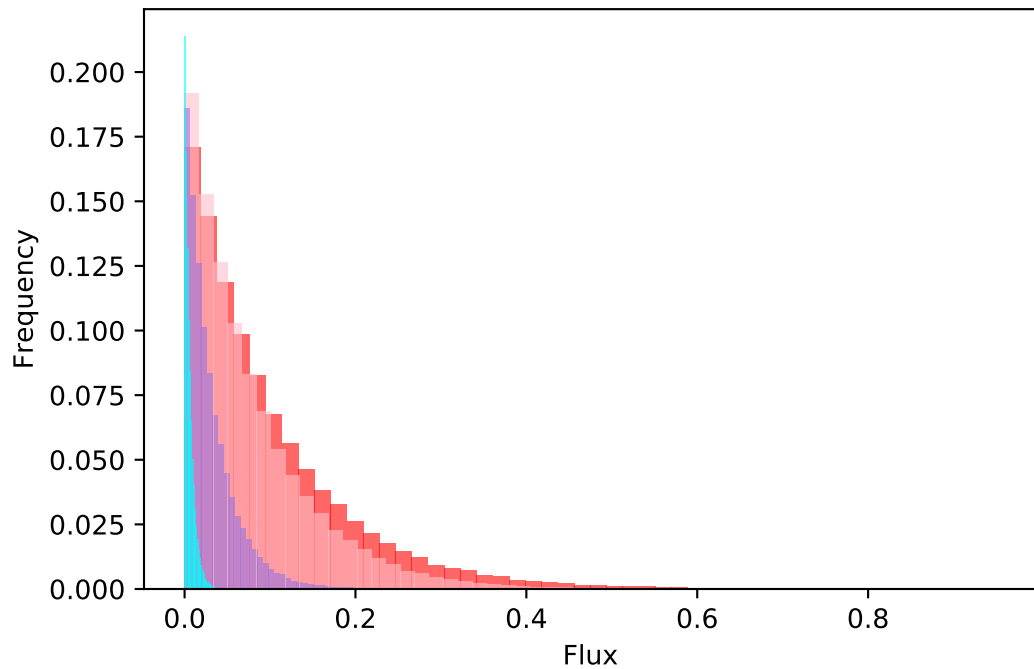
430 : Met_c --> Met_m
['-']
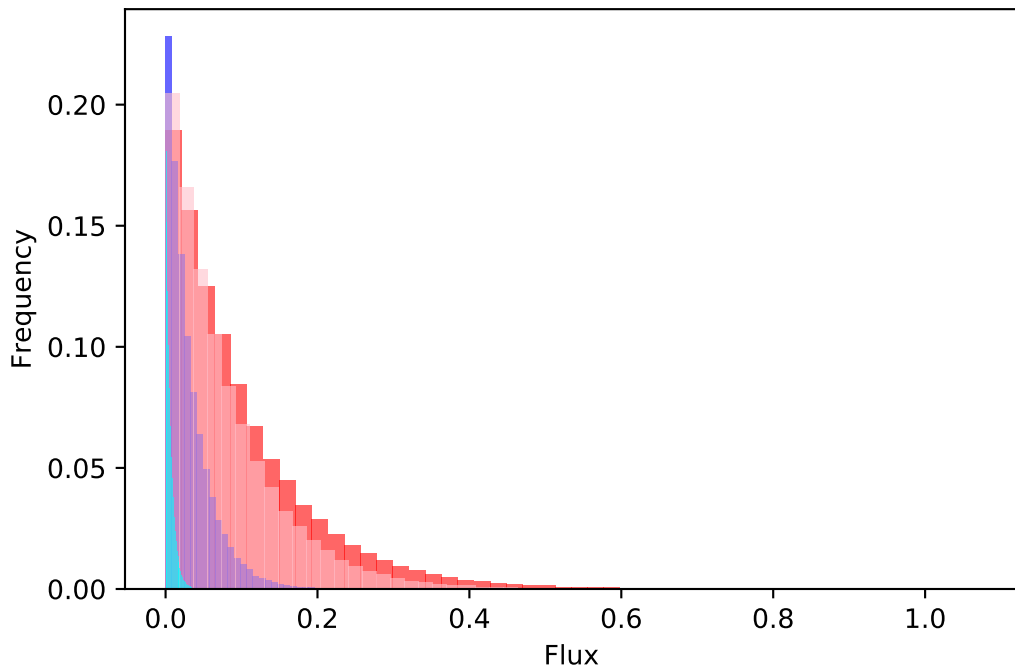
431 : Phe_h --> Phe_c
['-']
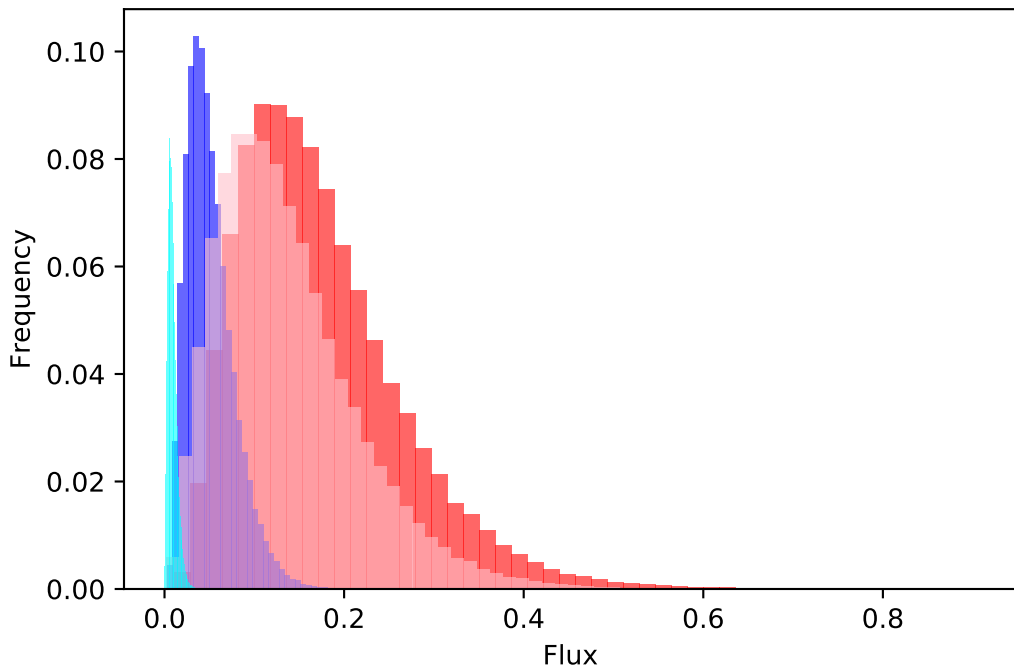
432 : Phe_c --> Phe_m
['-']
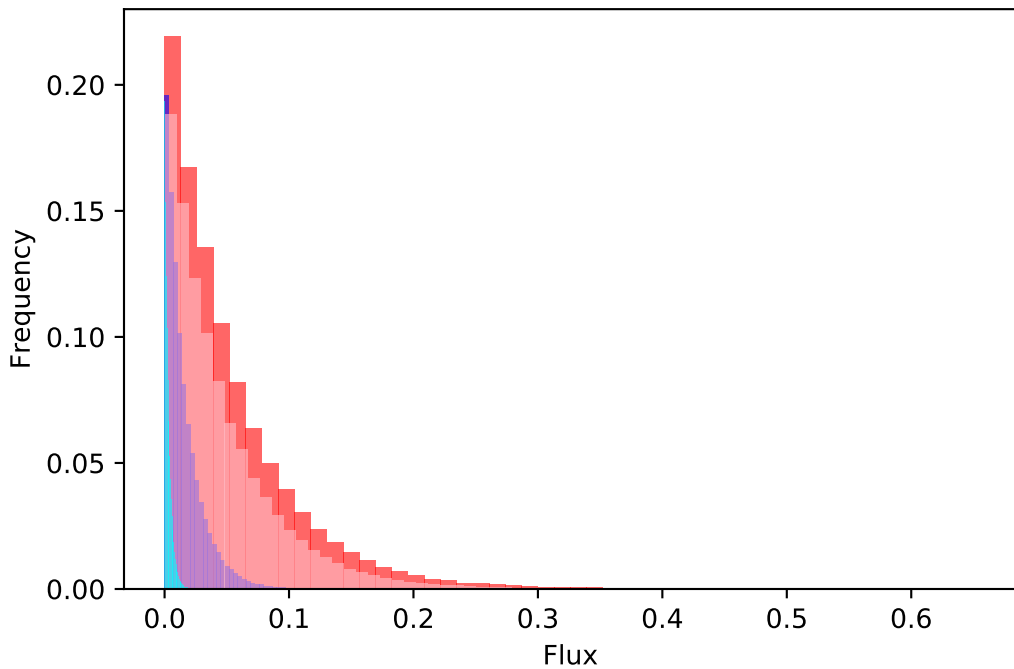
433 : Pro_c --> Pro_h
['-']
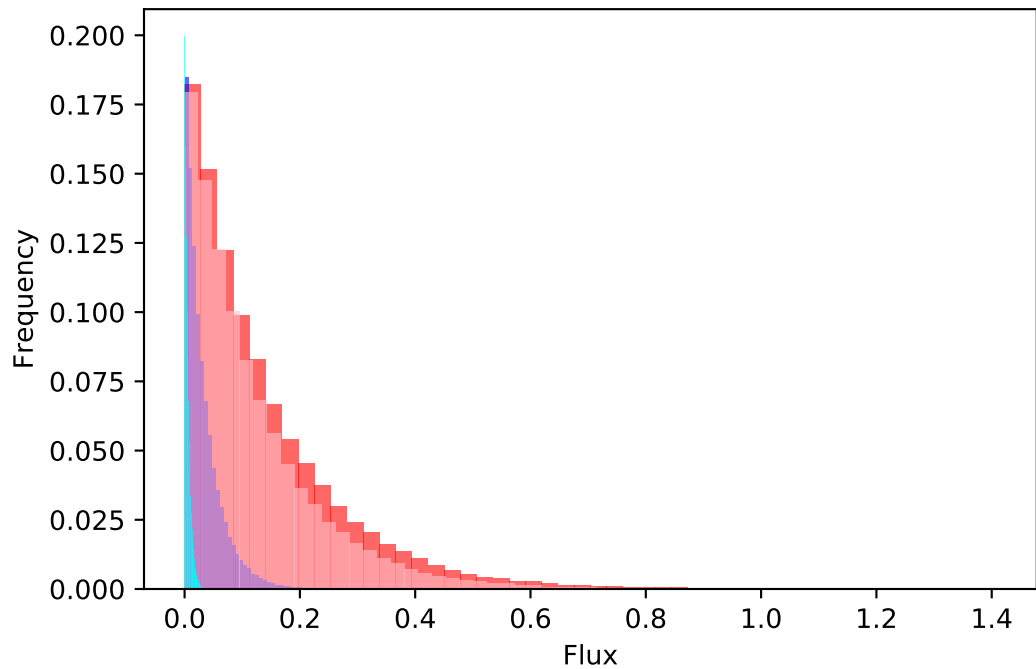
434 : Ser_h --> Ser_c
['-']
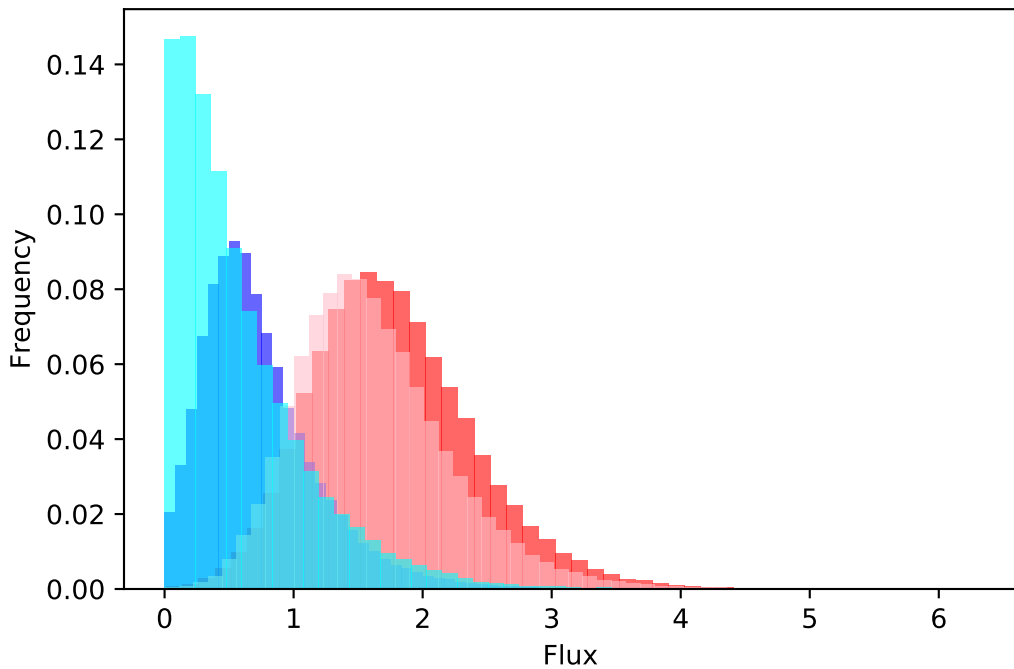
435 : Ser_c --> Ser_m
['-']
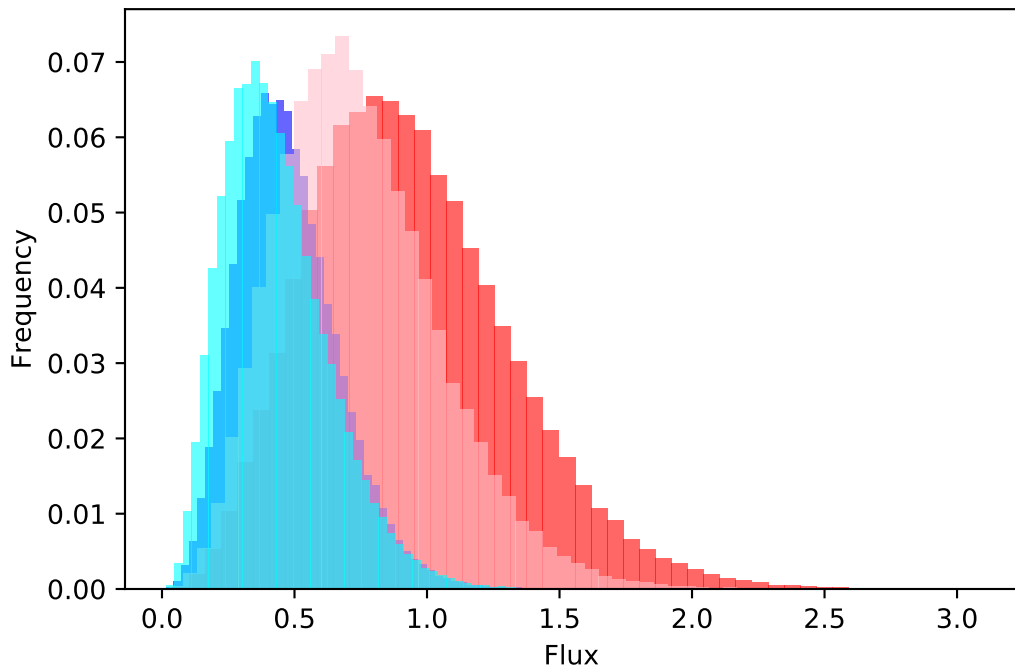
436 : Thr_h --> Thr_c
['-']
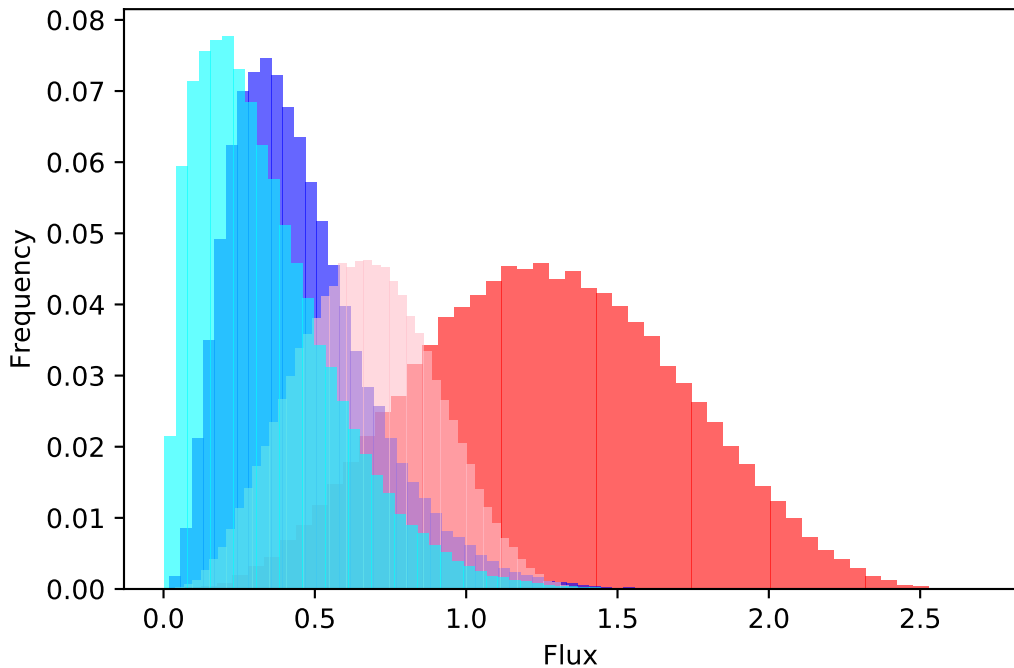
437 : Thr_c --> Thr_m
['-']
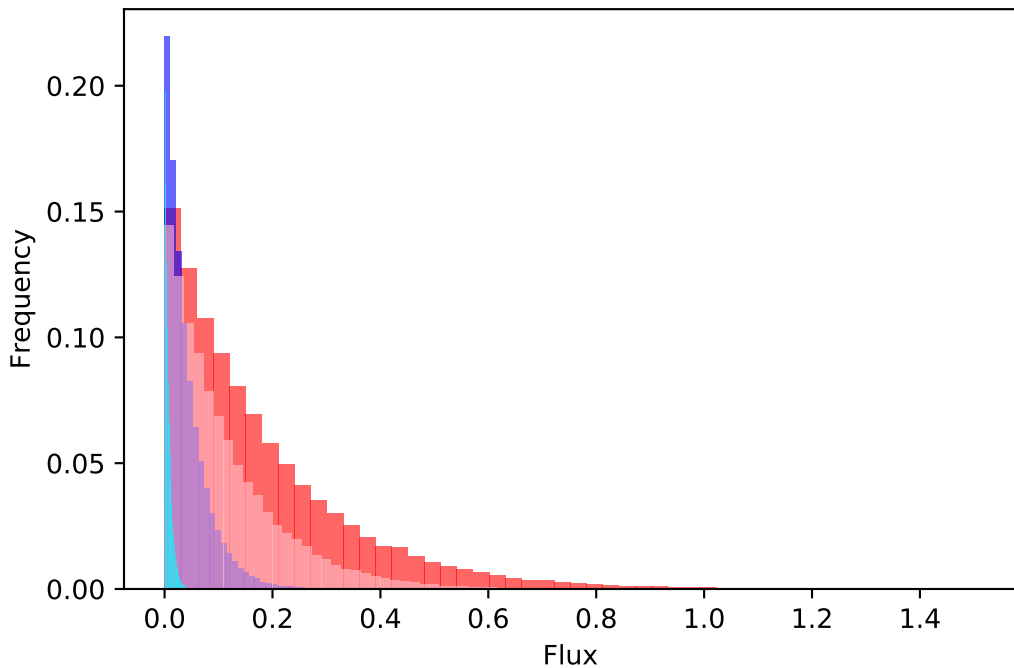
438 : Trp_h --> Trp_c
['-']
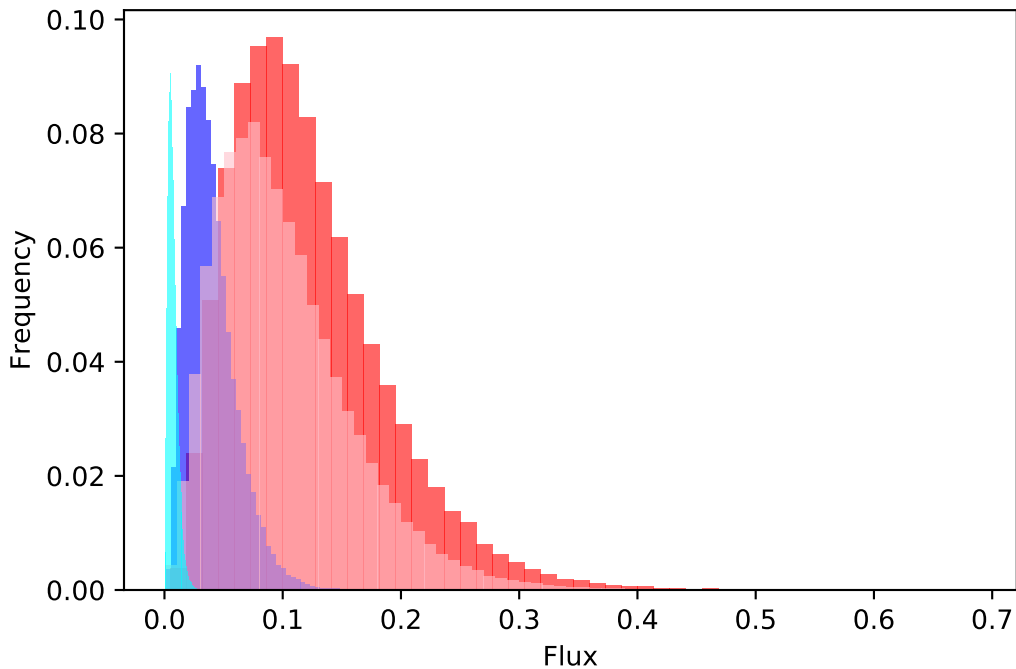
439 : Trp_c --> Trp_m
['-']
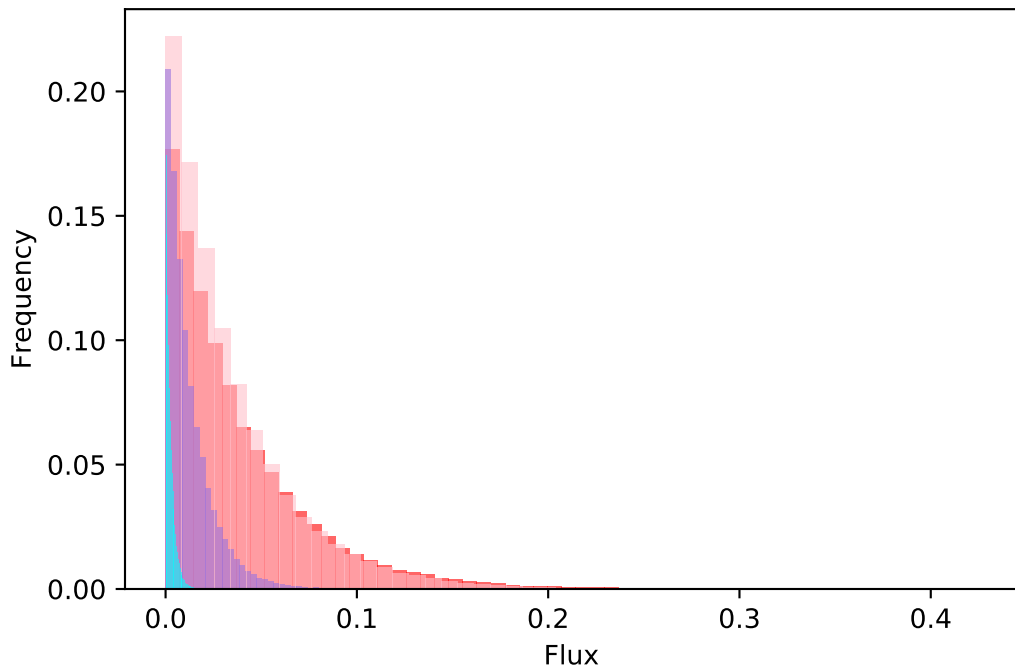
440 : Tyr_h --> Tyr_c
['-']
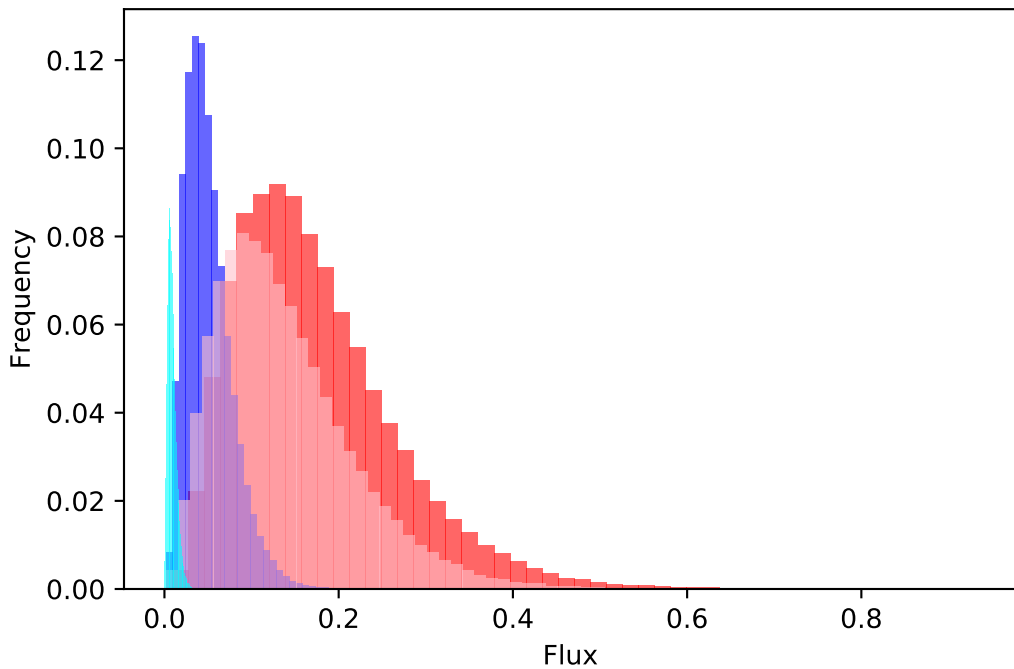
441 : Tyr_c --> Tyr_m
['-']
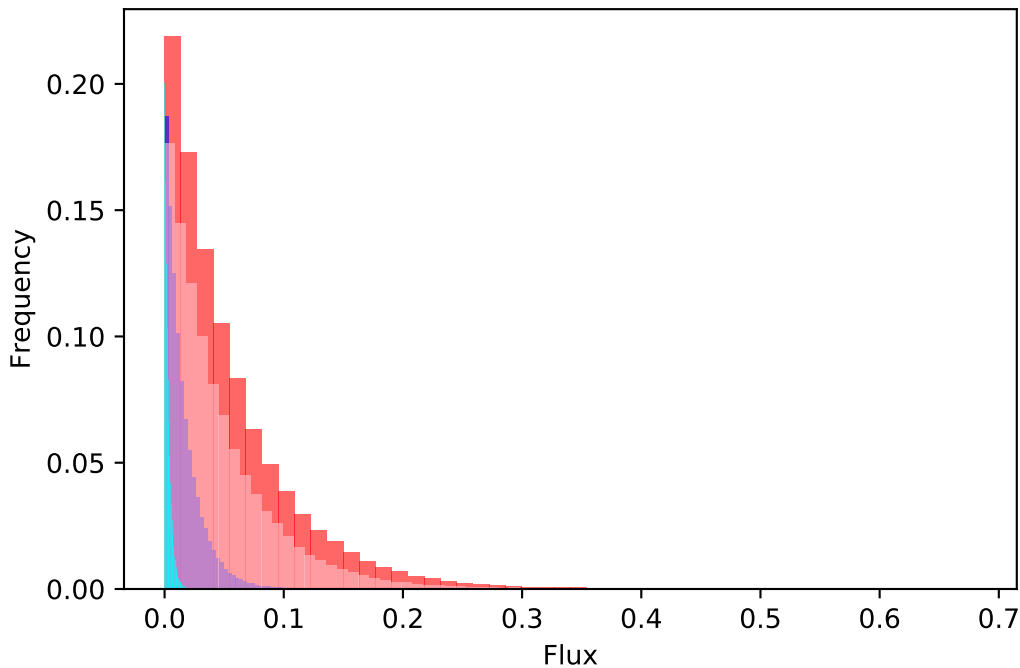
442 : Val_h --> Val_c
['-']
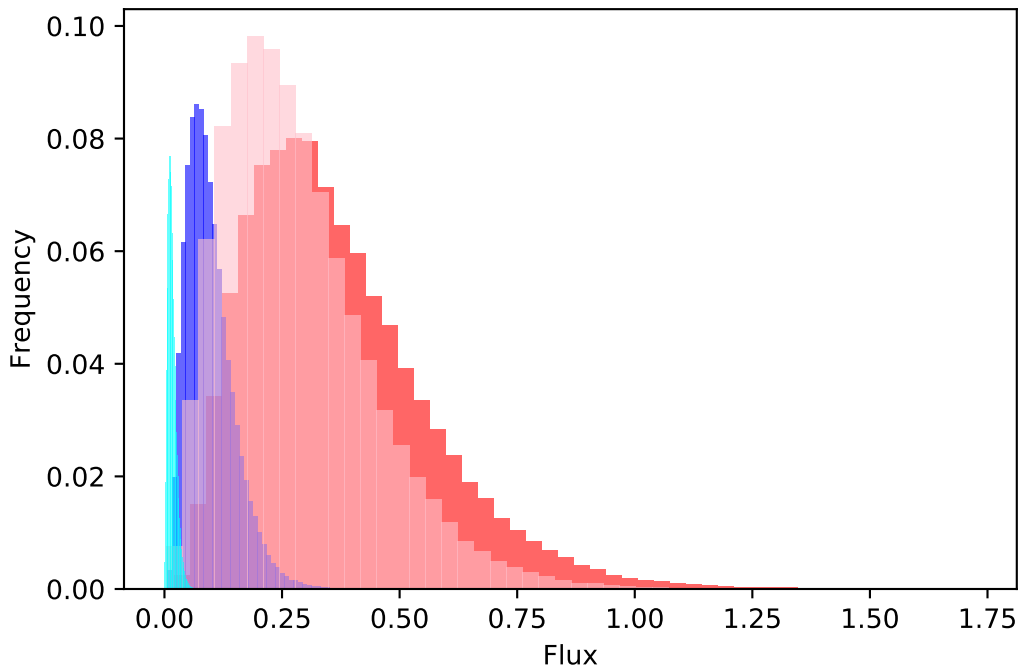
443 : Val_c --> Val_m
['-']
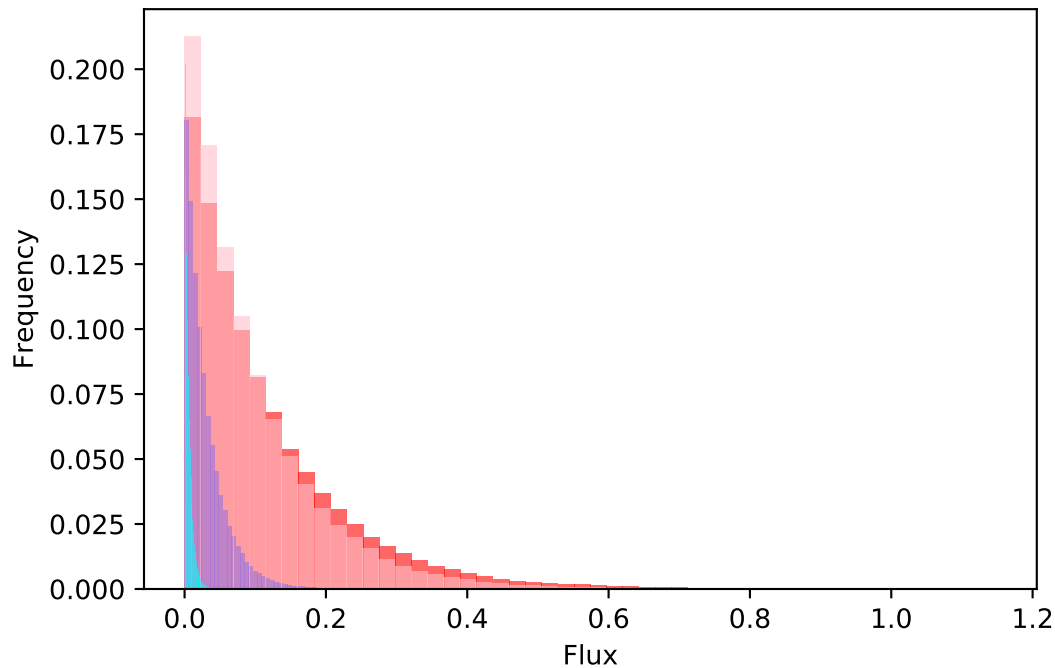
444 : <=> H_c
['-']
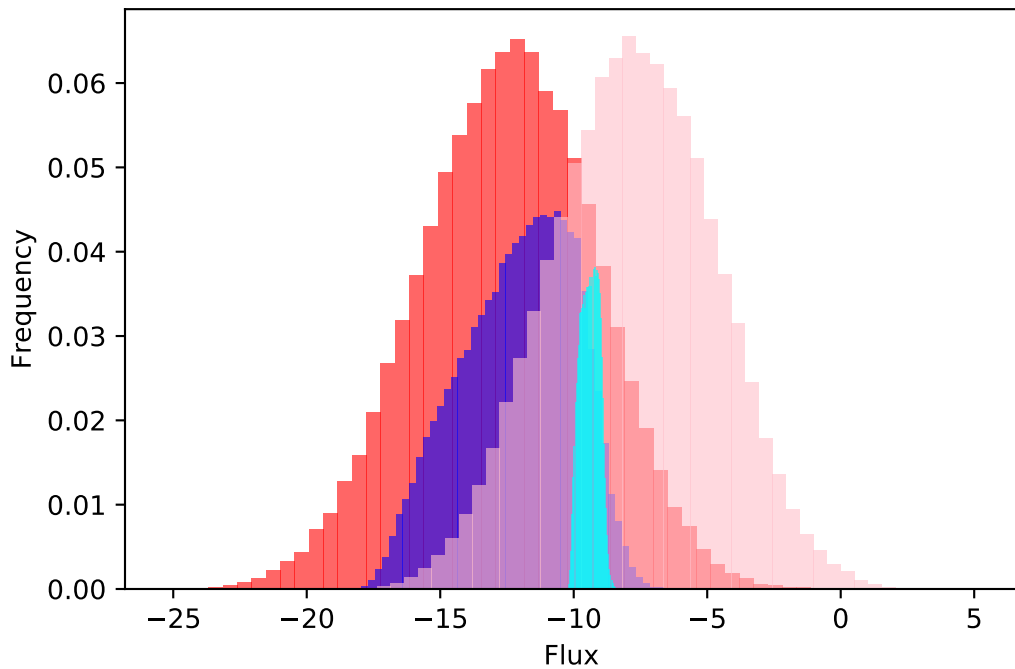
445 : --> hnu_h
['-']
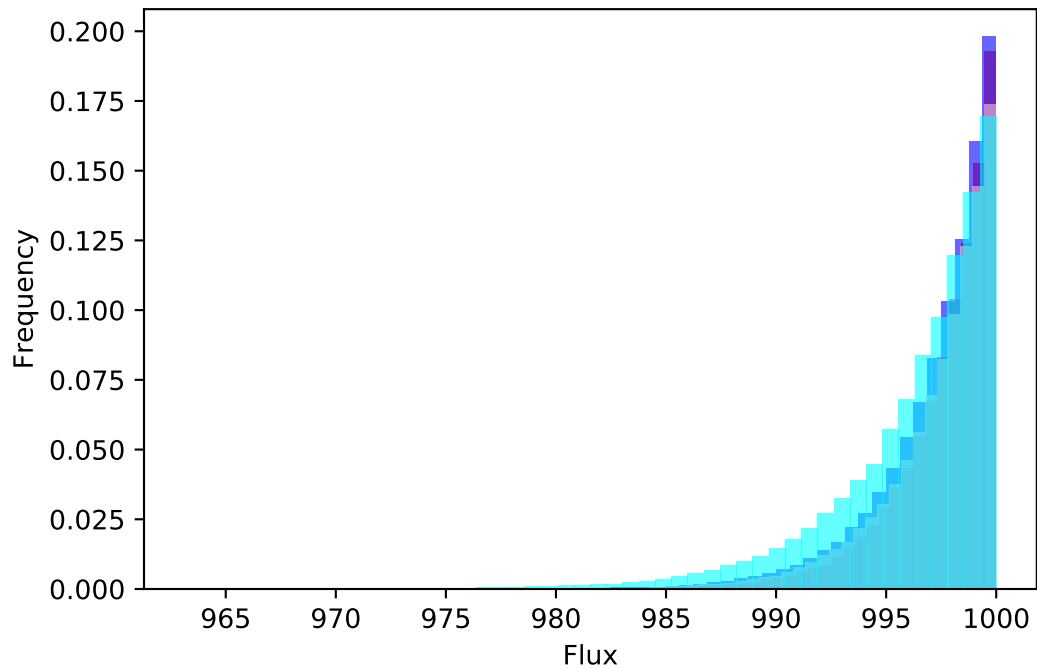
446 : --> CO2_c
['-']
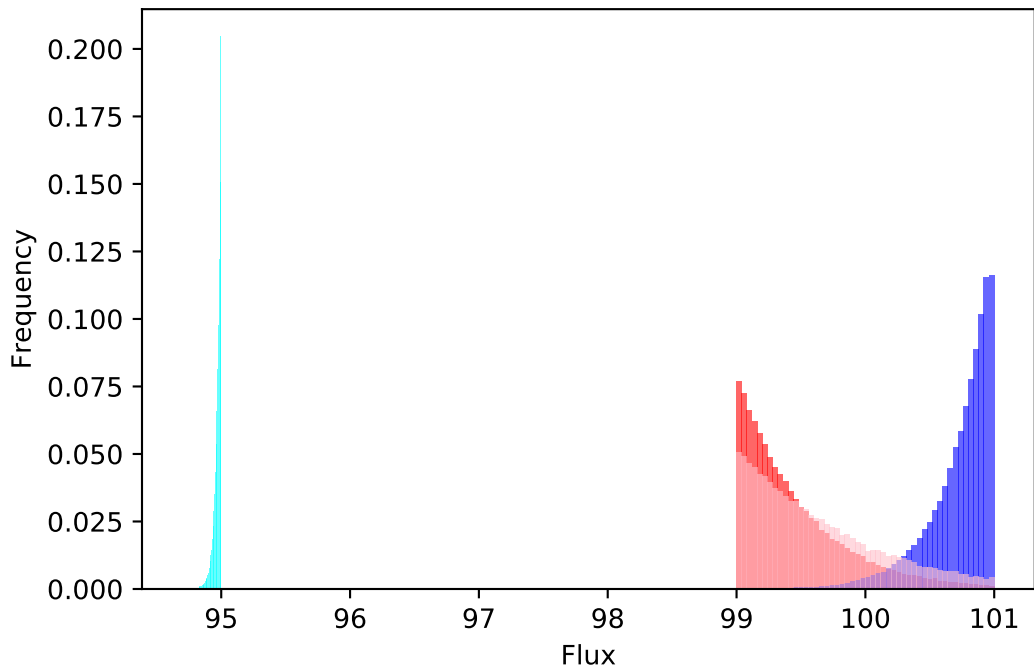
447 : --> H2O_c
['-']
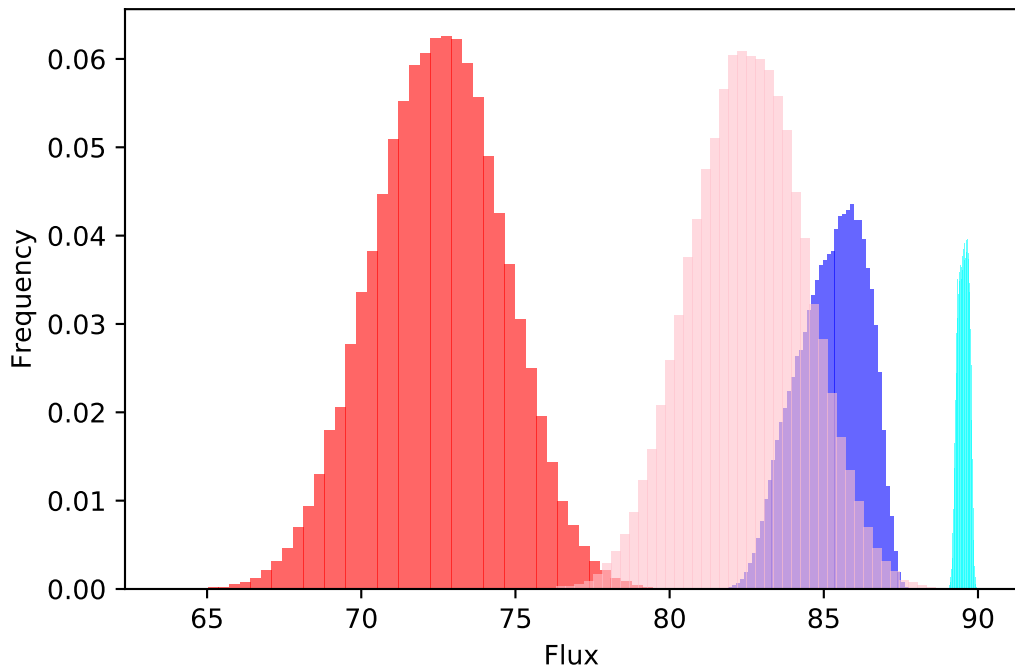
448 : 3.0 ATP_c + 3.0 H2O_c --> 3.0 ADP_c + 2.0 H_h + 3.0 Pi_c + Pi_h
['-']

449 : 2.0 ATP_c + 2.0 H2O_c --> 2.0 ADP_c + 2.0 H_c + NO3_c + 2.0 Pi_c
['-']

450 : --> NH4_c
['-']

451 : 3.0 ATP_c + 3.0 H2O_c --> 3.0 ADP_c + 3.0 H_c + 3.0 Pi_c + SO4_c
['-']
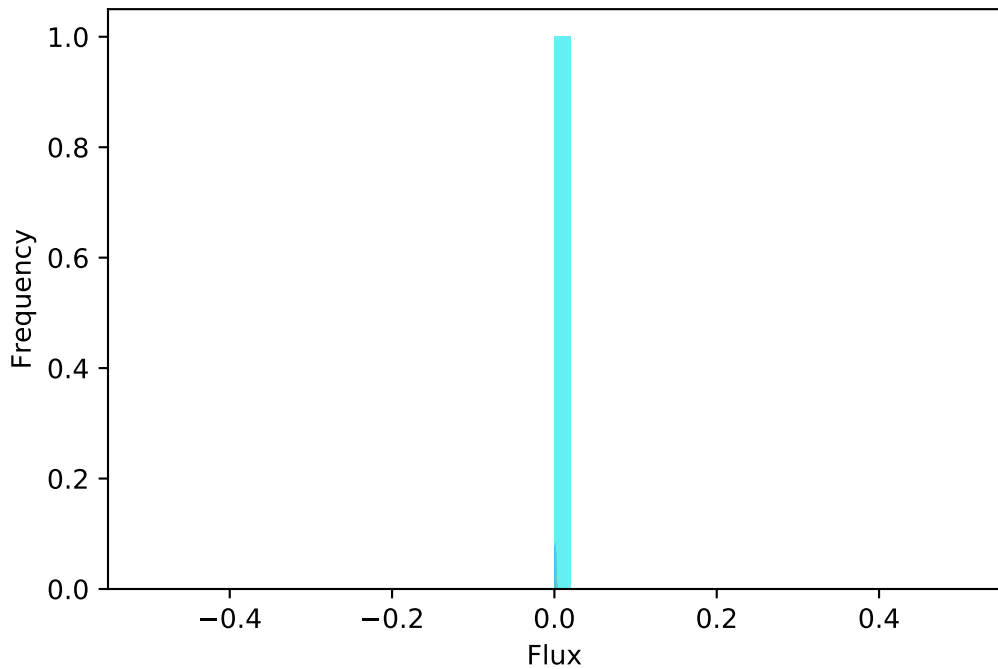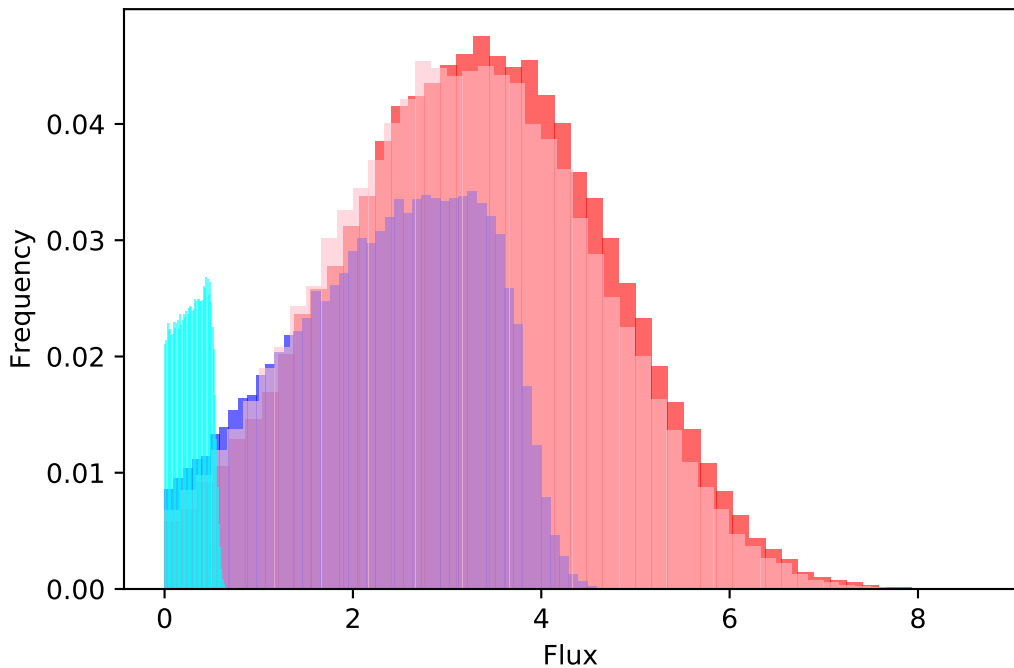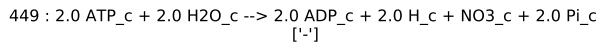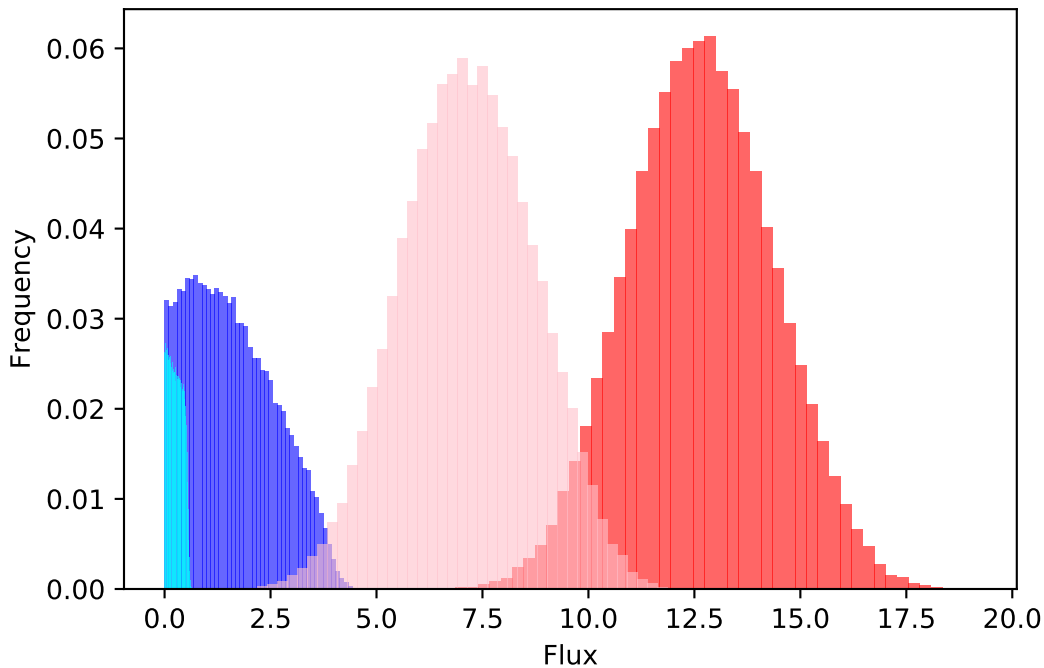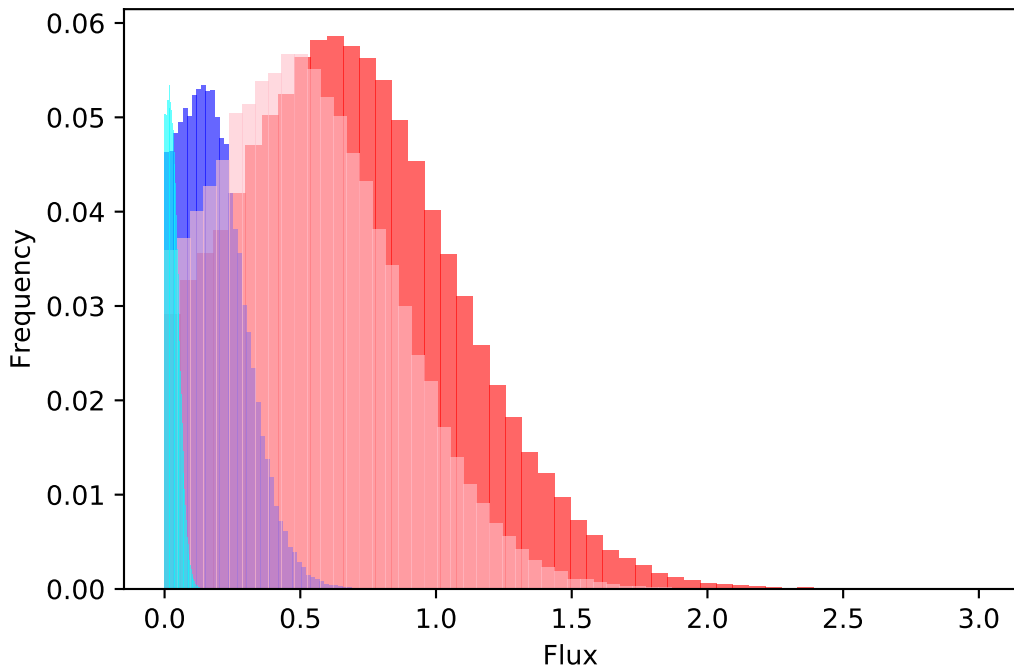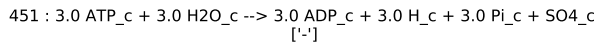
452 :  --> H2S_c
['-']
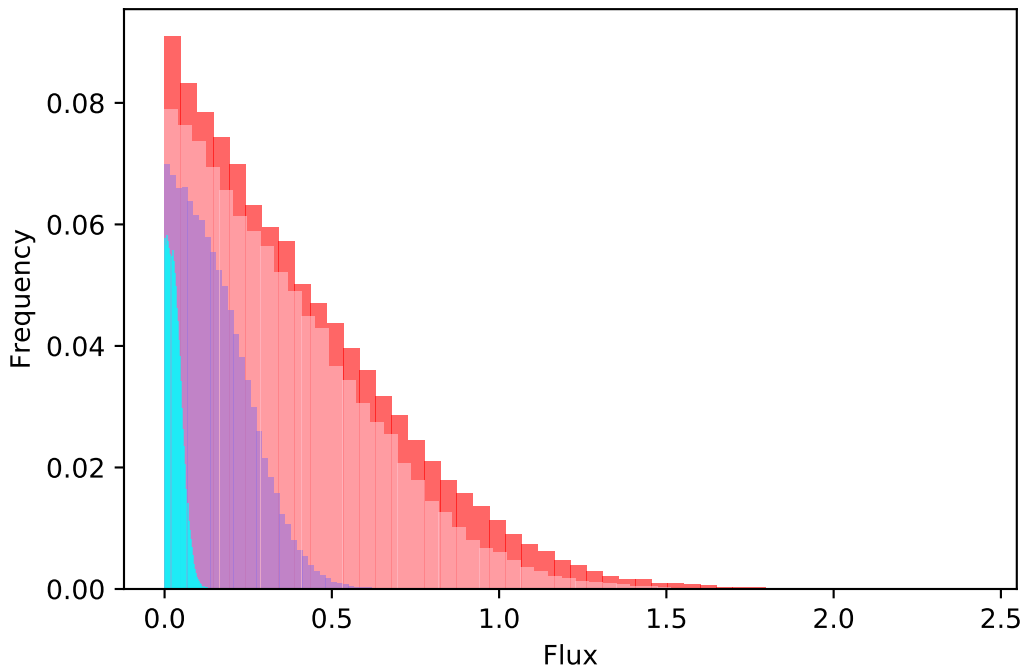
453 : O2_c -->
['-']
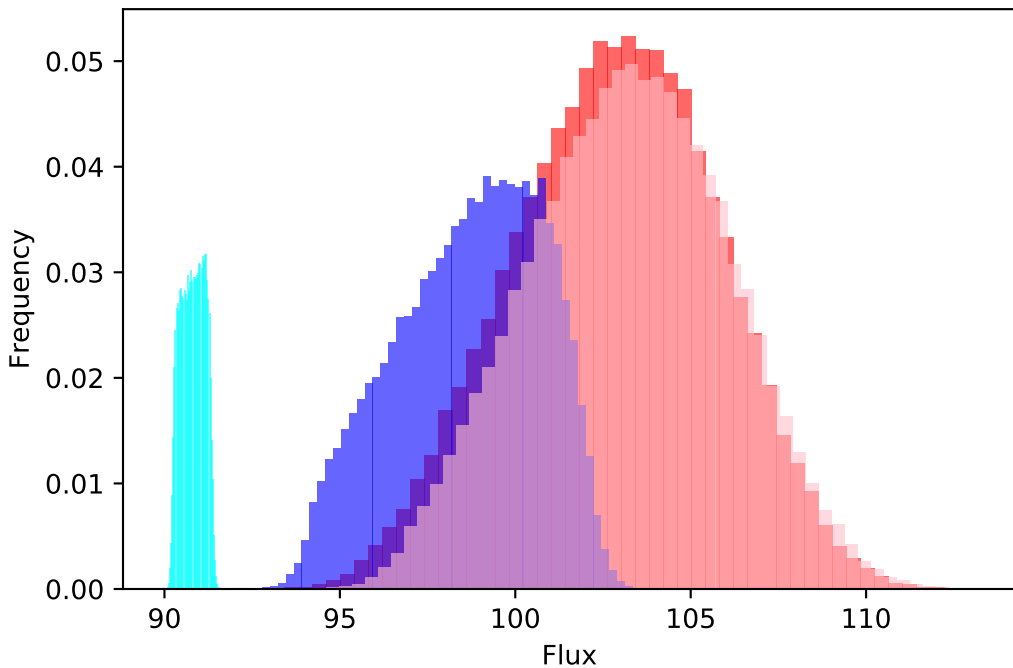
454 : Ala_c -->
['-']
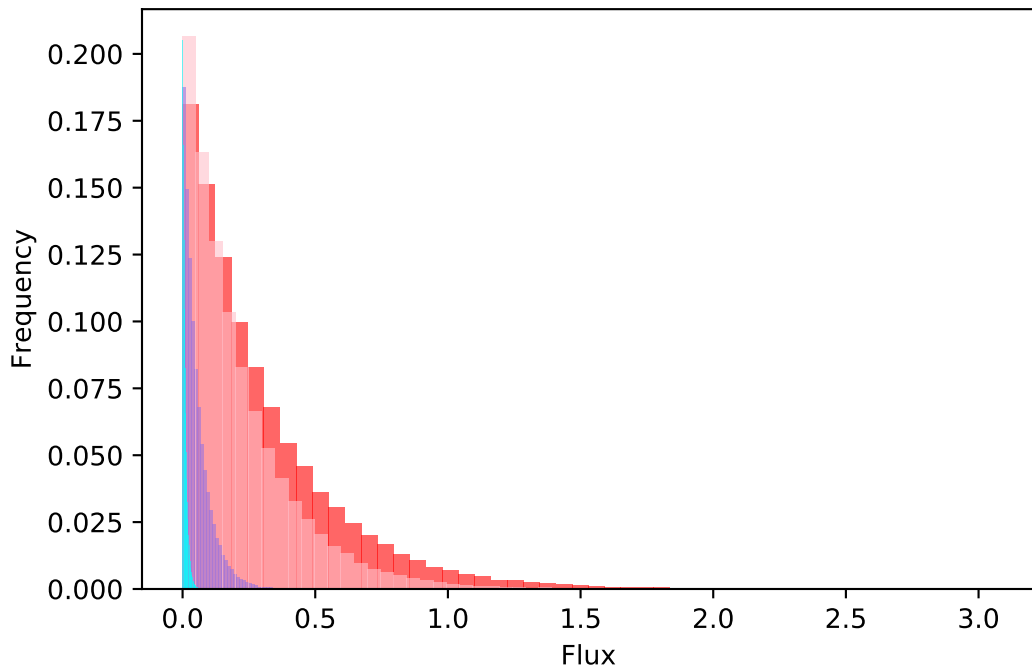
455 : Ala_h -->
['-']
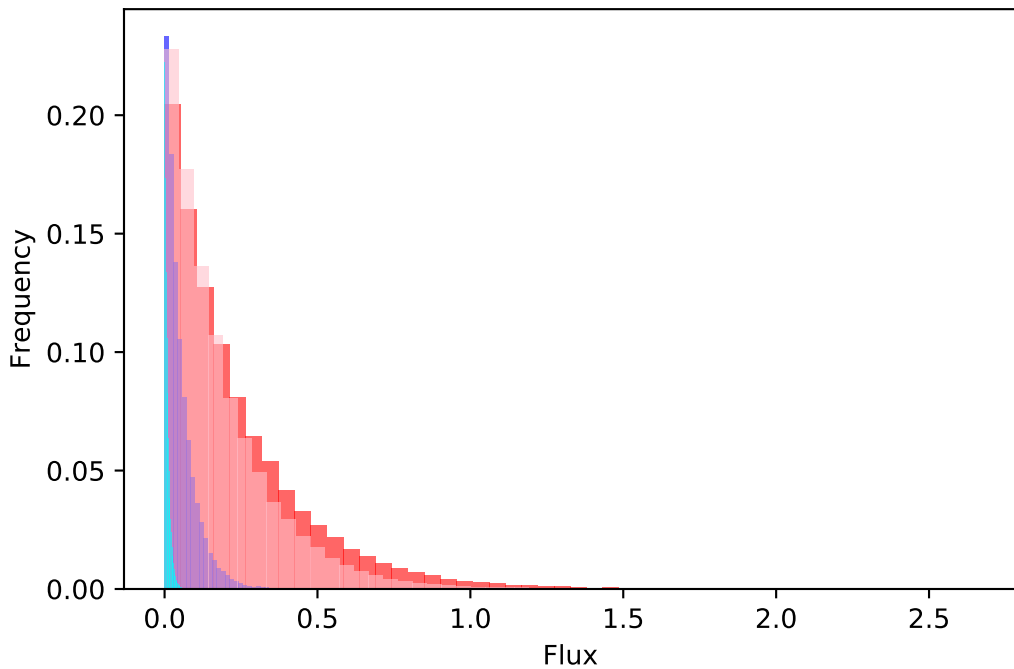
456 : Ala_m -->
['-']
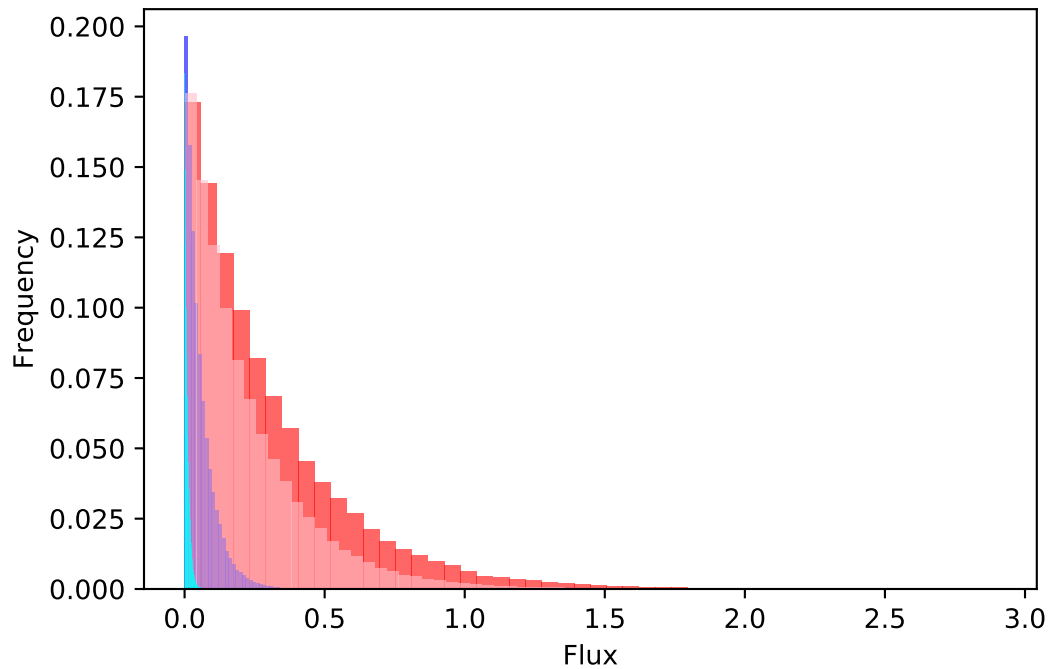
457 : Ala_p -->
['-']
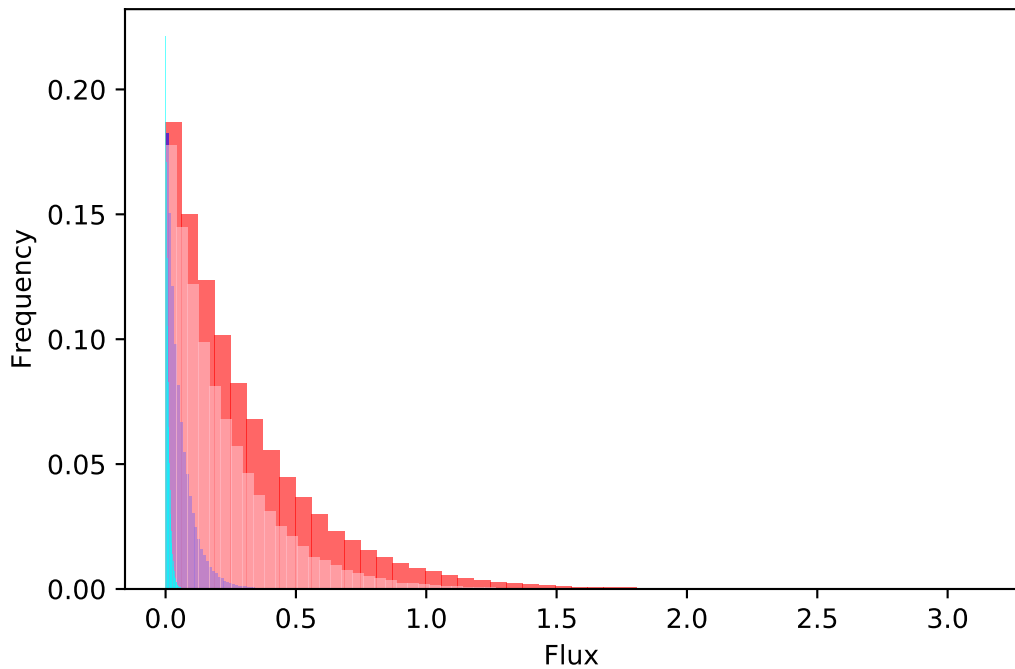
458 : Arg_c -->
['-']
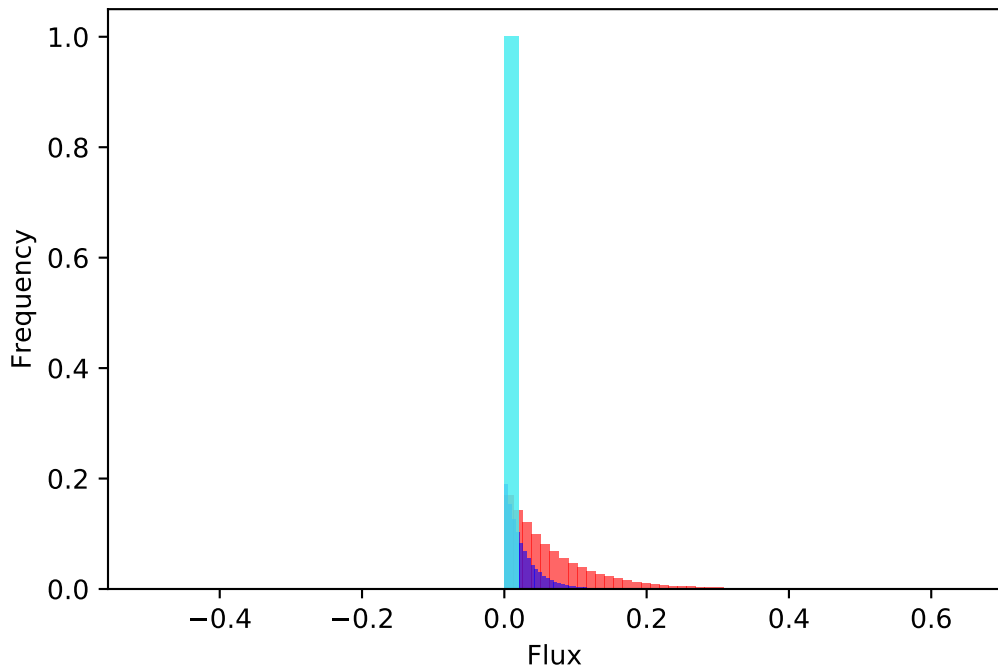
459 : Arg_h -->
['-']
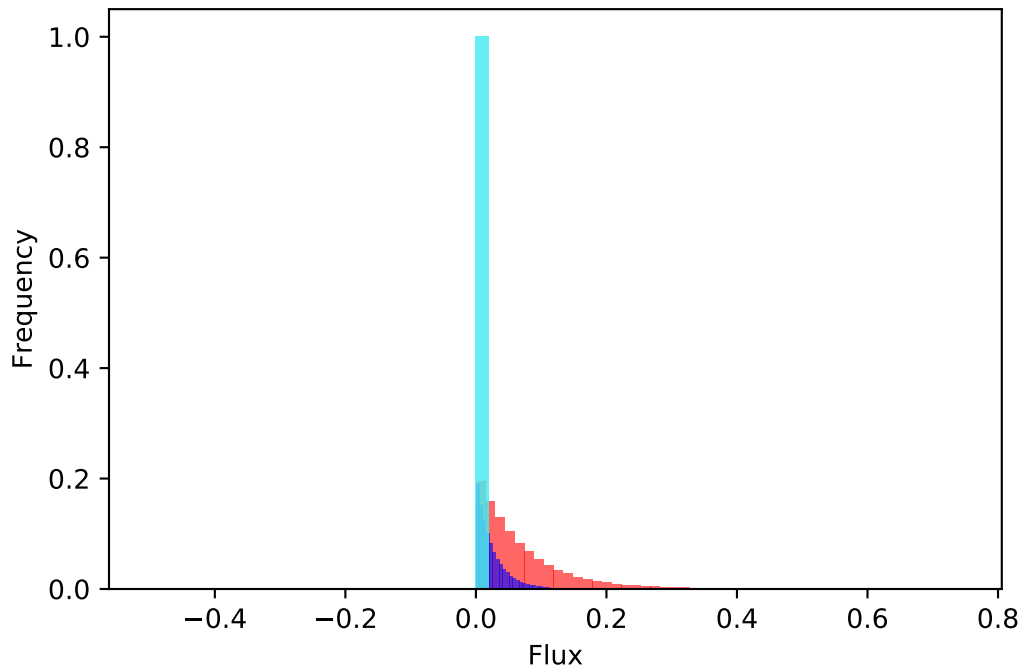
460 : Arg_m -->
['-']
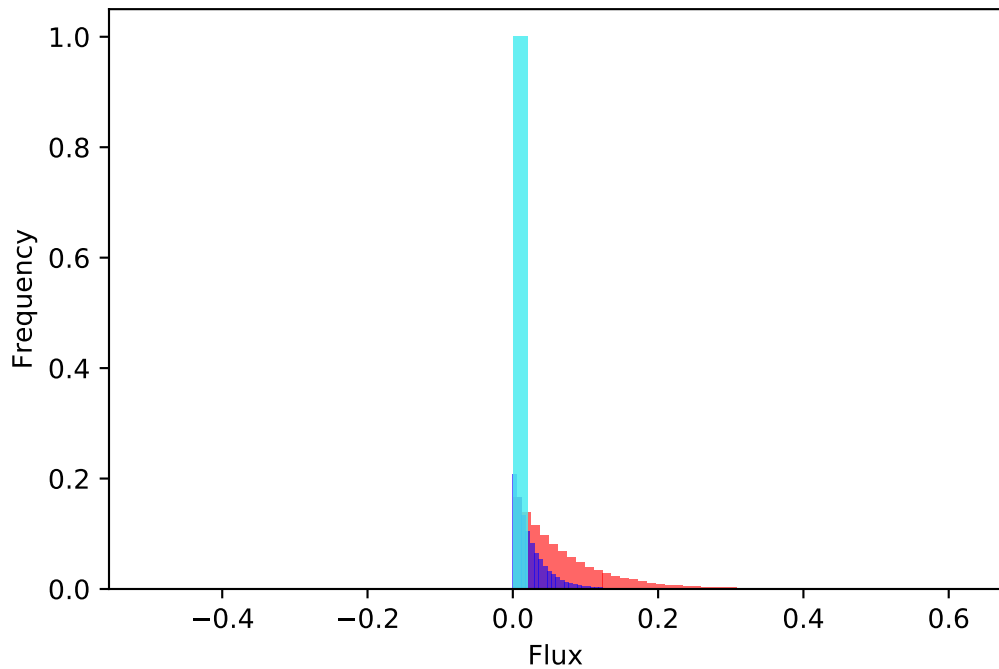
461 : Arg_p -->
['-']
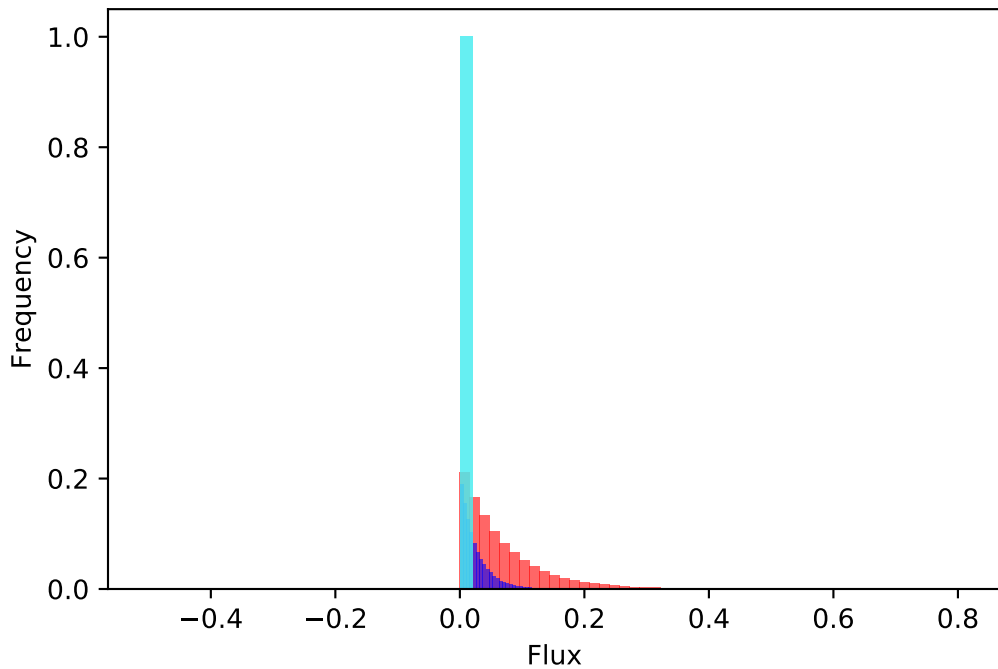
462 : Asn_c -->
['-']
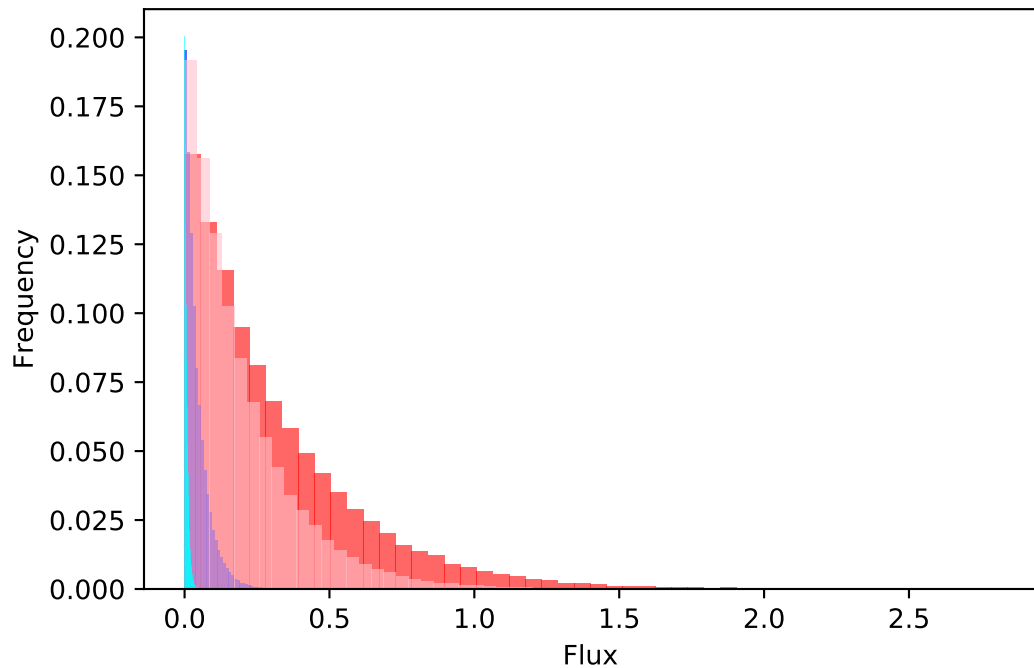
463 : Asn_h -->
['-']
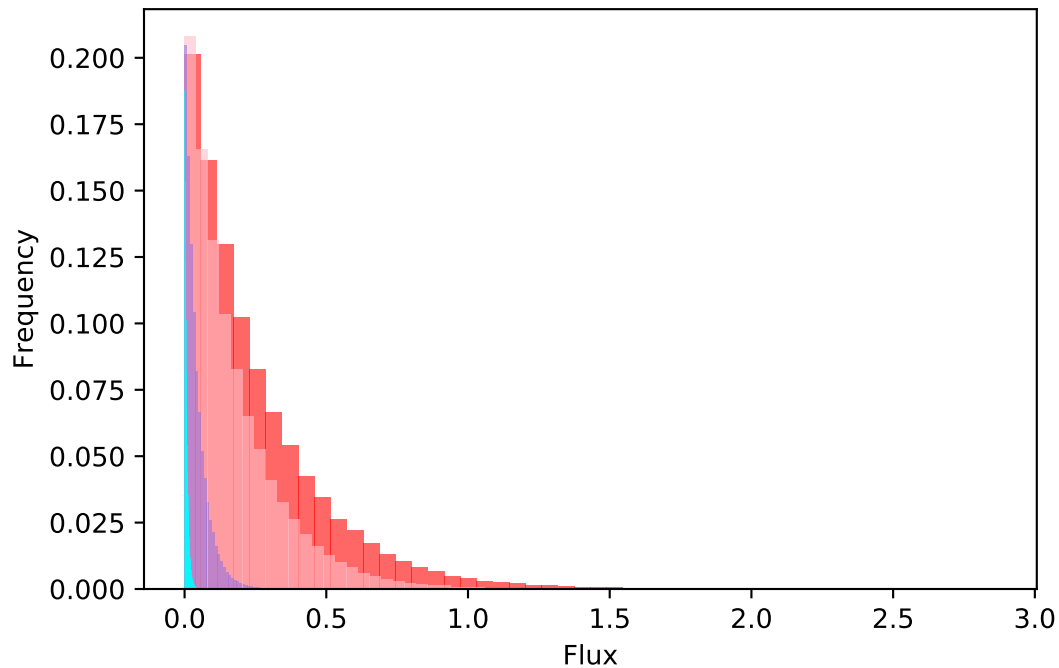
464 : Asn_m -->
['-']
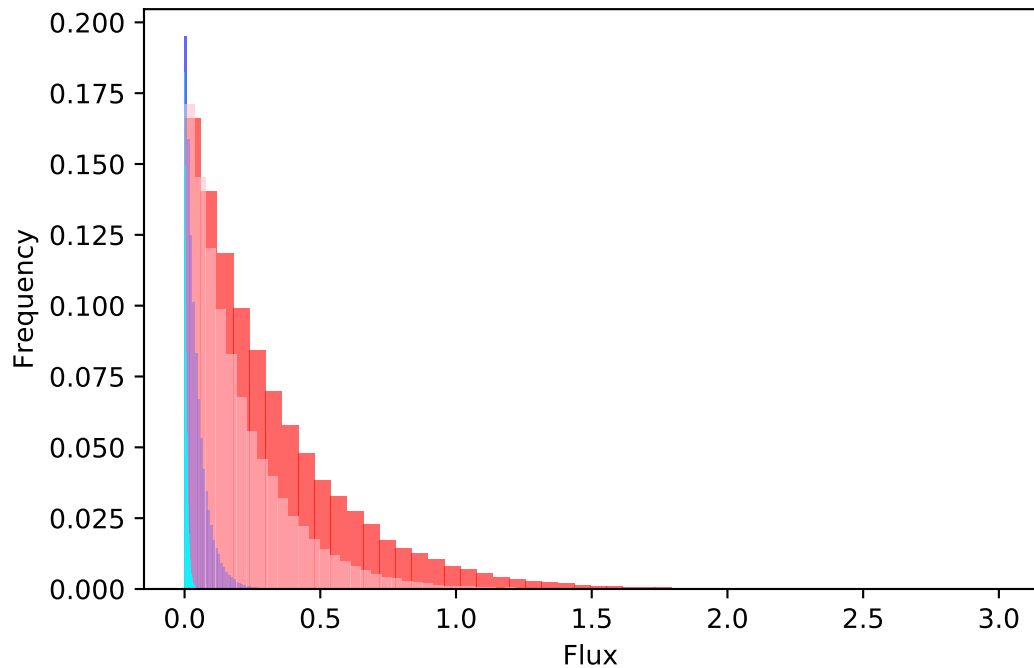
465 : Asn_p -->
['-']
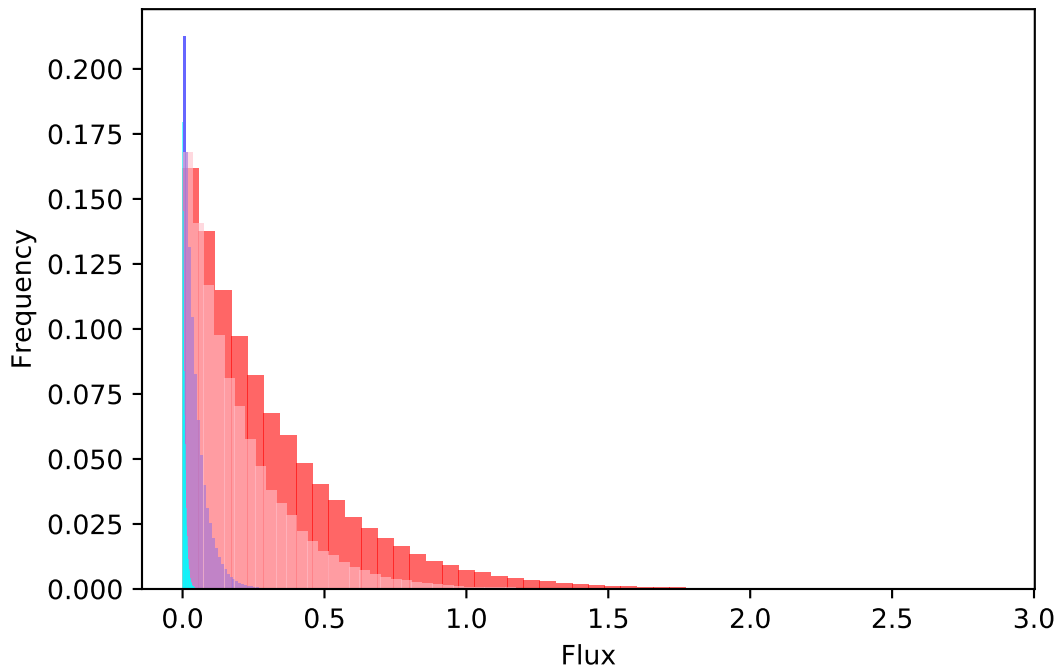
466 : Asp_c -->
['-']
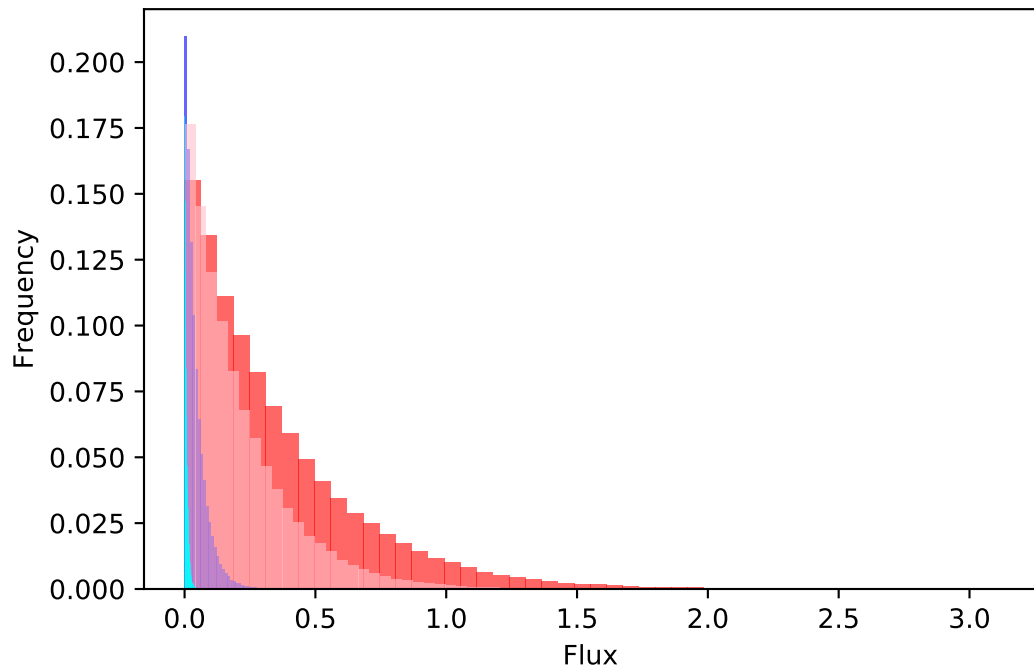
467 : Asp_h -->
['-']
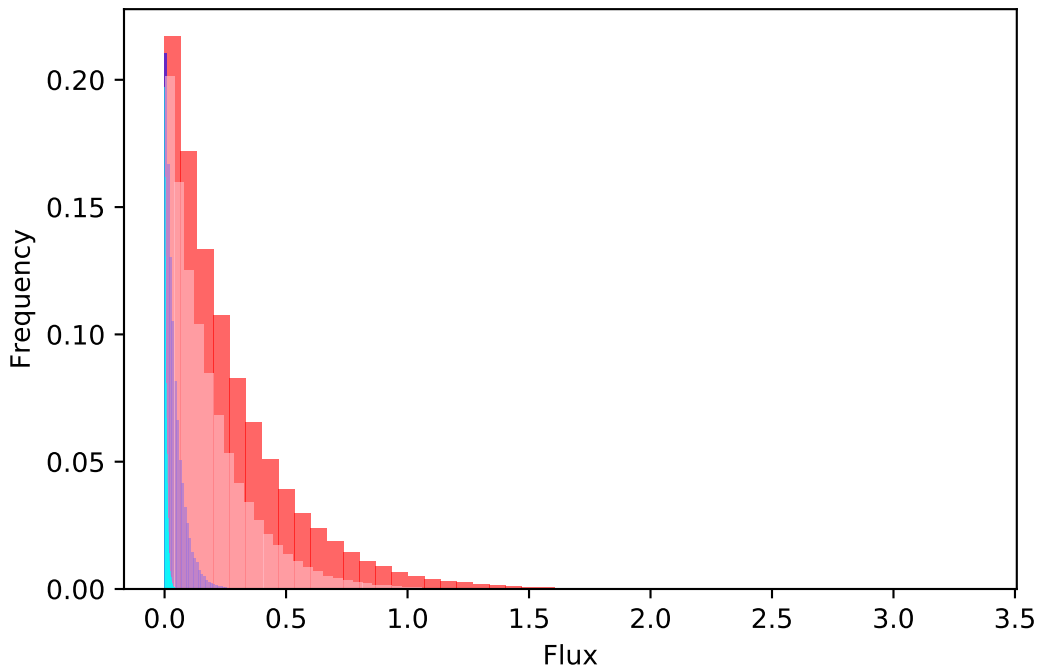
468 : Asp_m -->
['-']
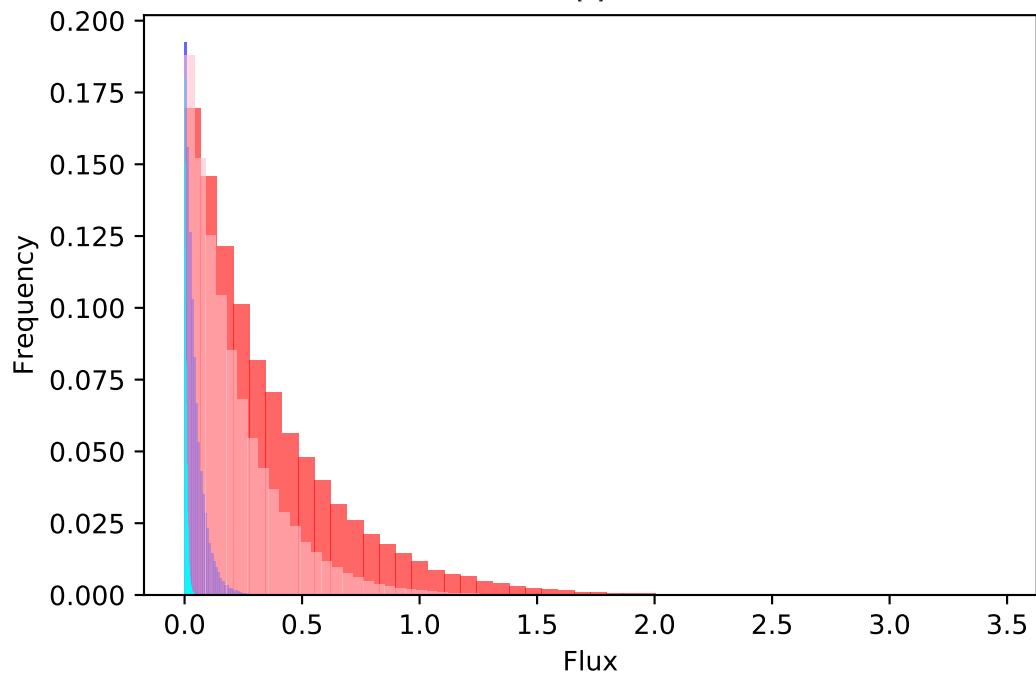
469 : Asp_p -->
['-']
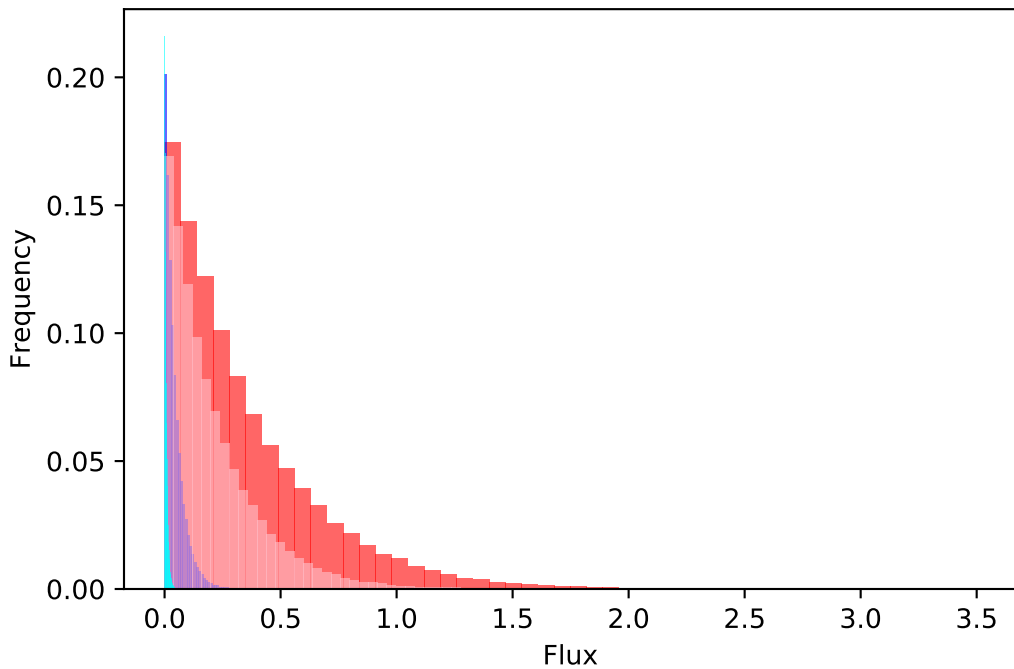
470 : Cys_c -->
['-']
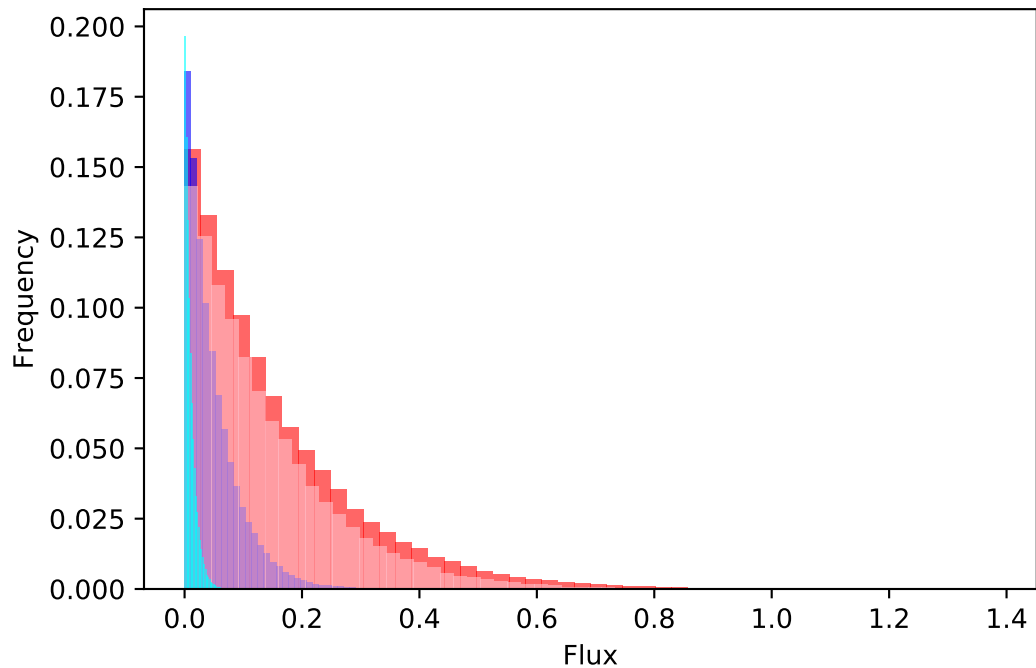
471 : Cys_h -->
['-']
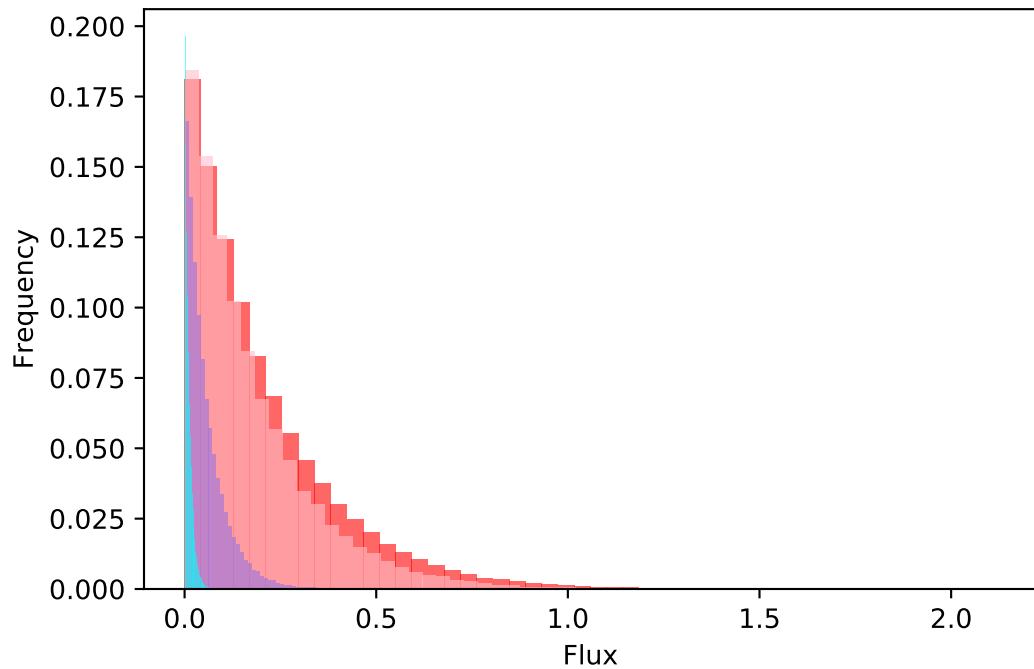
472 : Cys_m -->
['-']

473 : Cys_p -->
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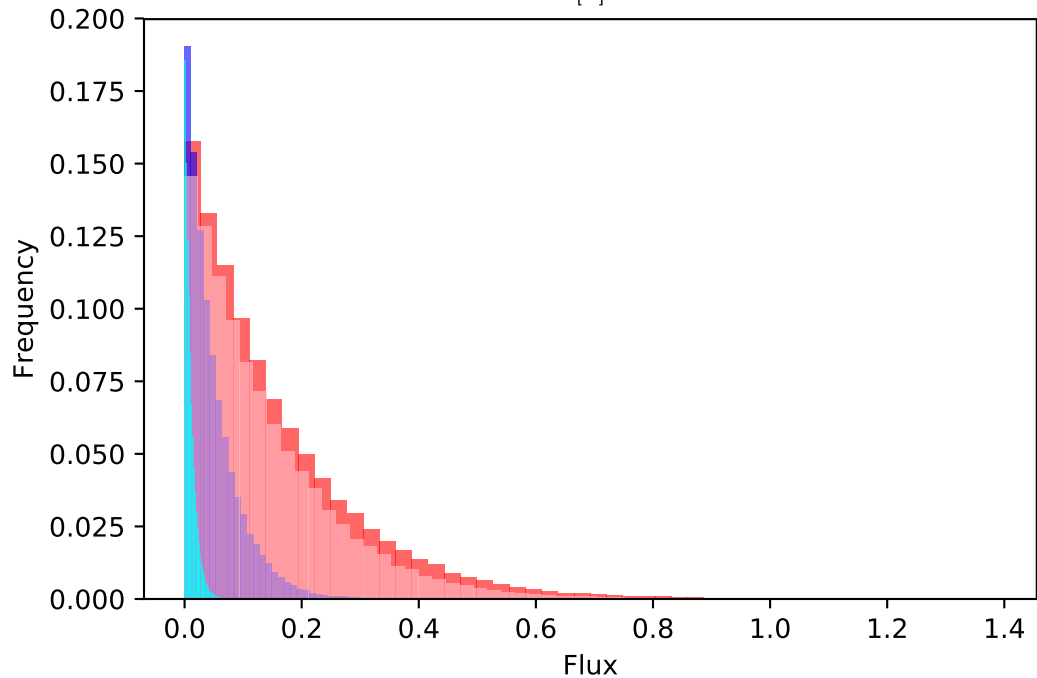
474 : Gln_c -->
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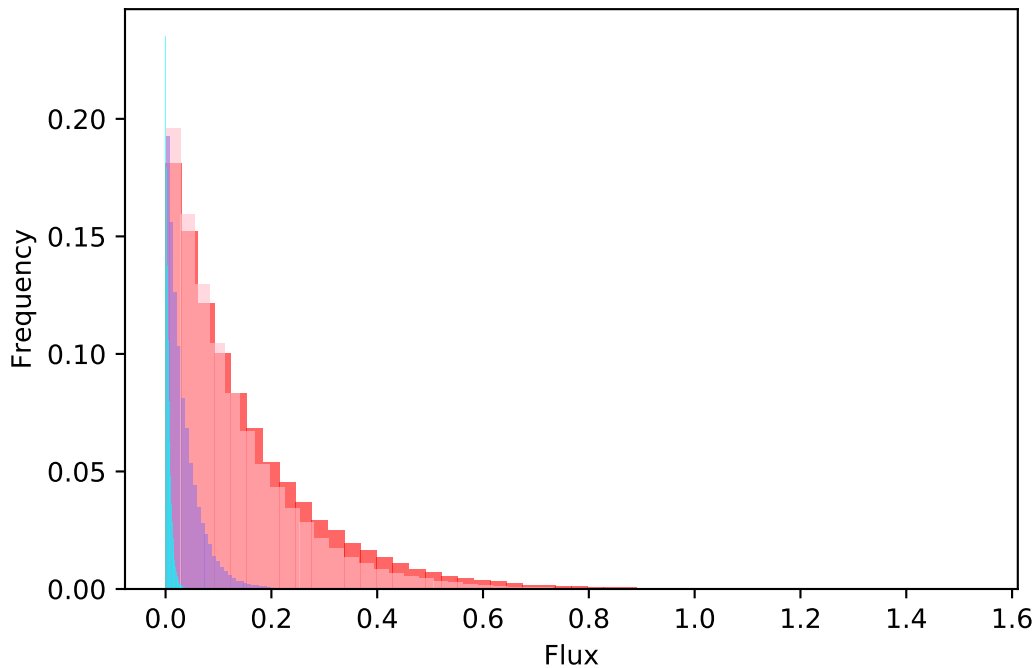
475 : Gln_h -->
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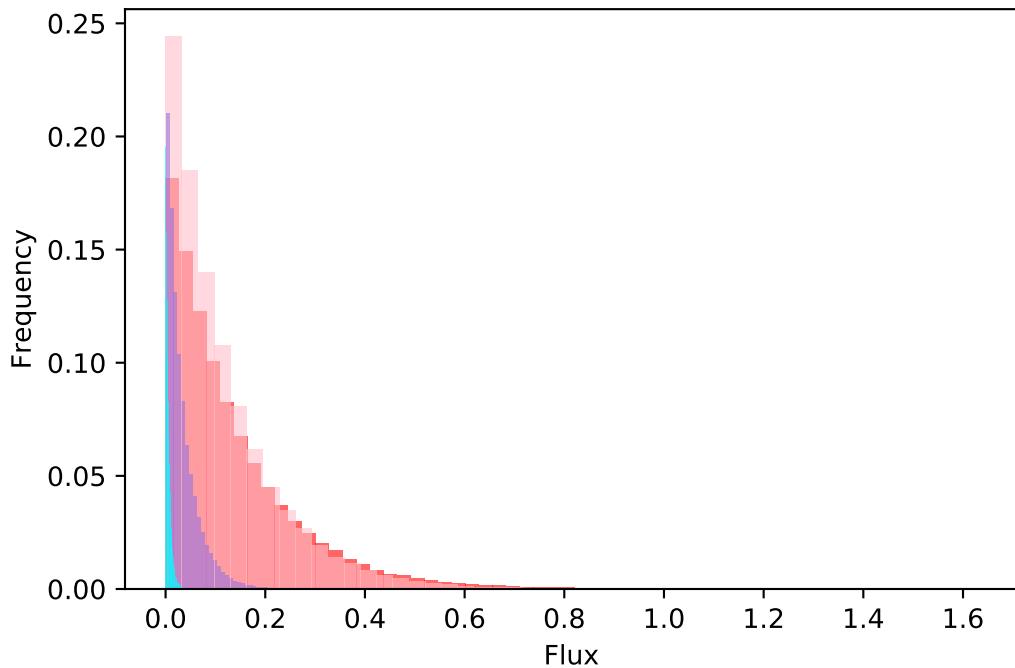
476 : Gln_m -->
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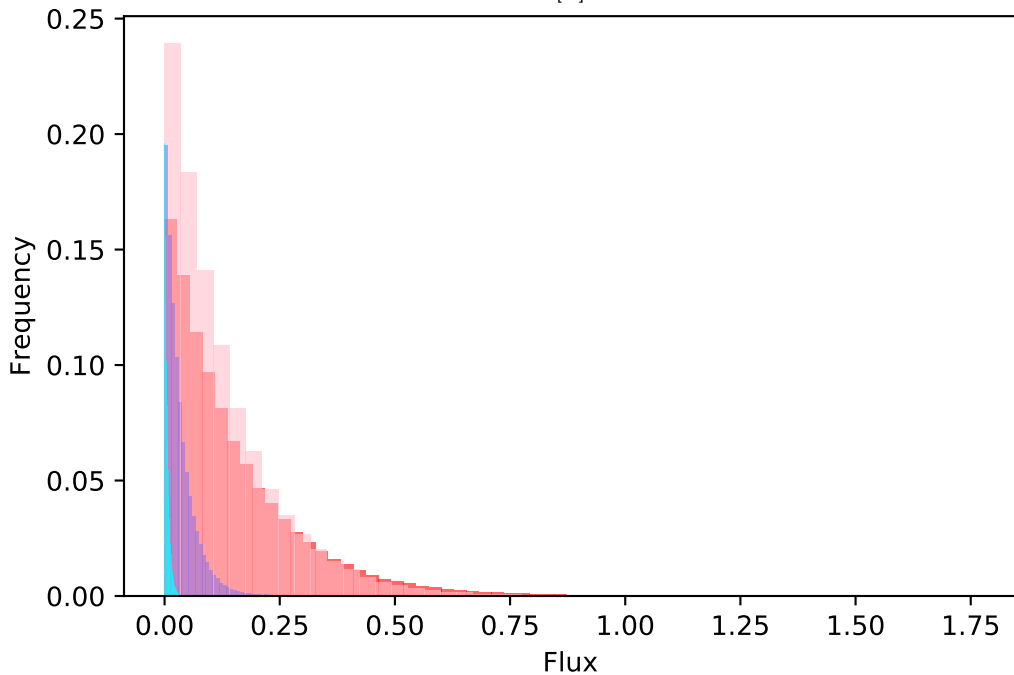
477 : Gln_p -->
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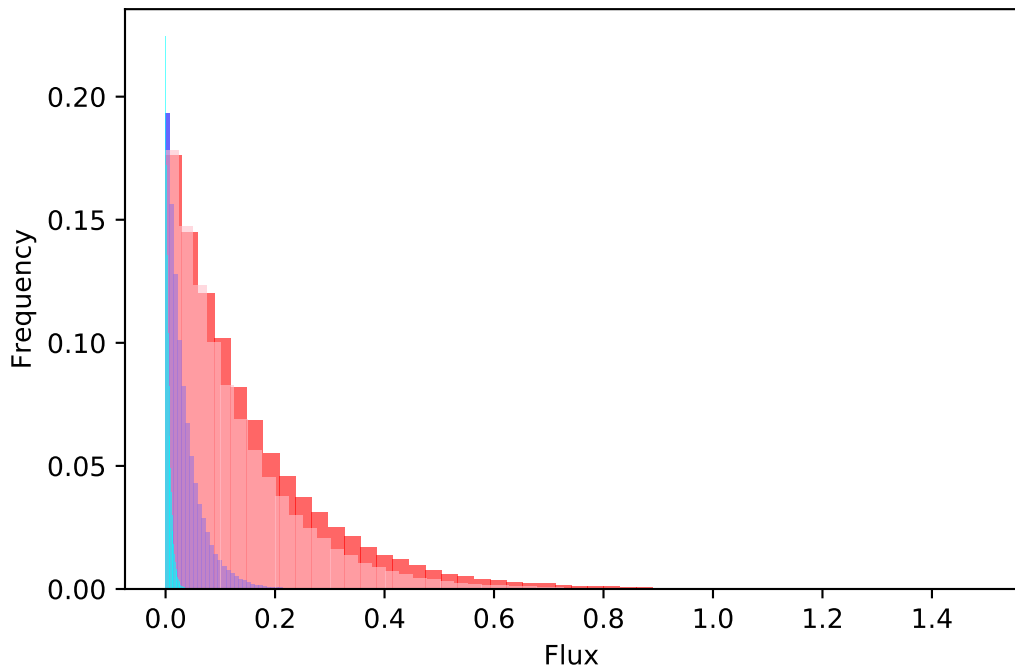
478 : Glu_c -->
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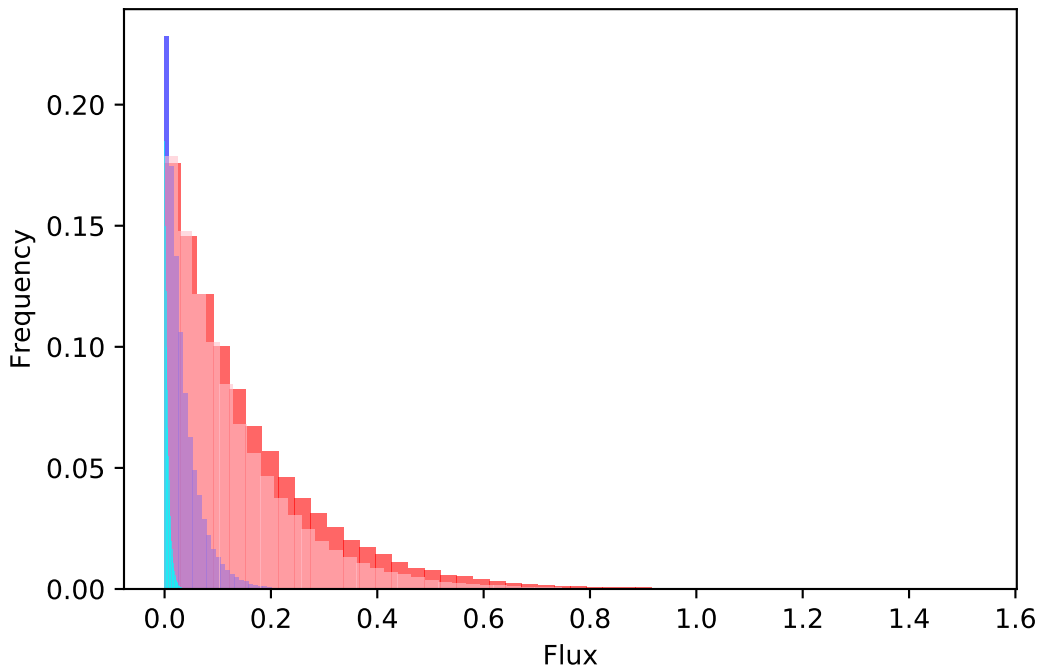
479 : Glu_h -->
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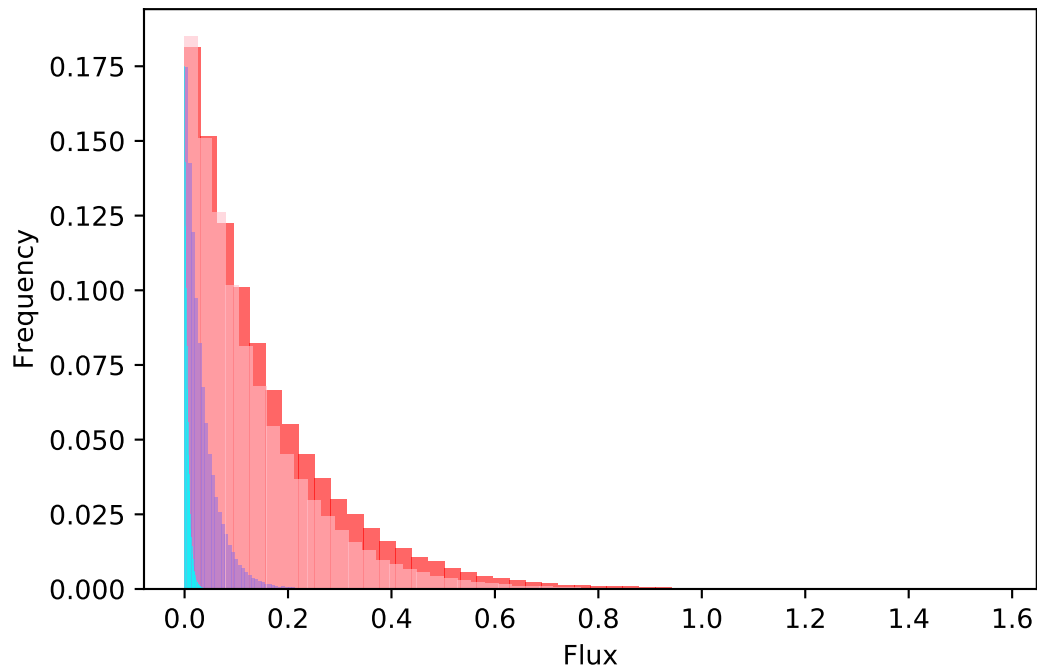
480 : Glu_m -->
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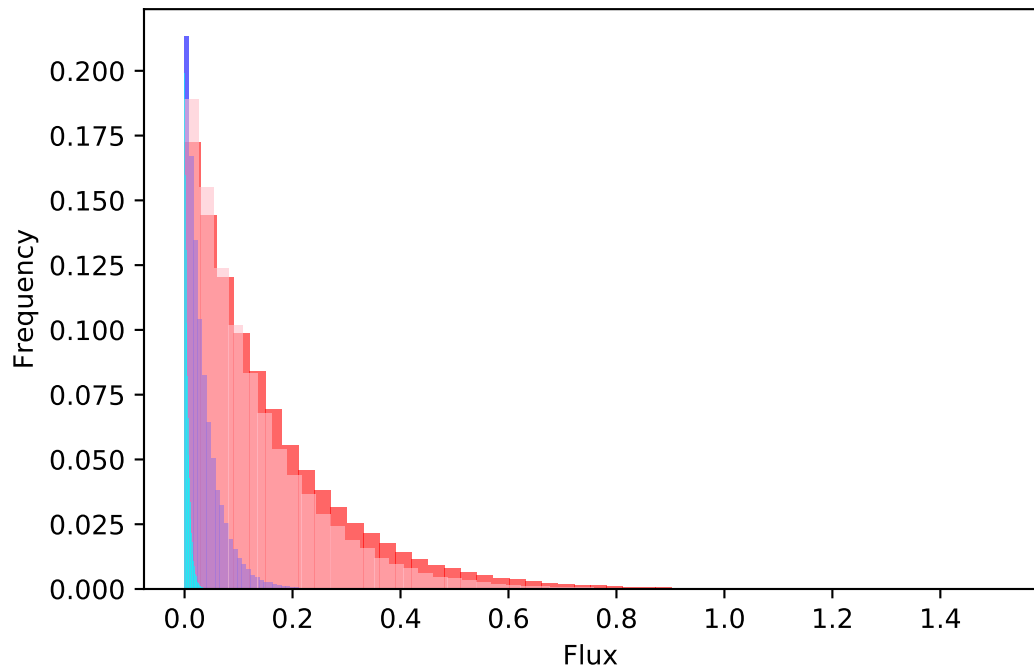
481 : Glu_p -->
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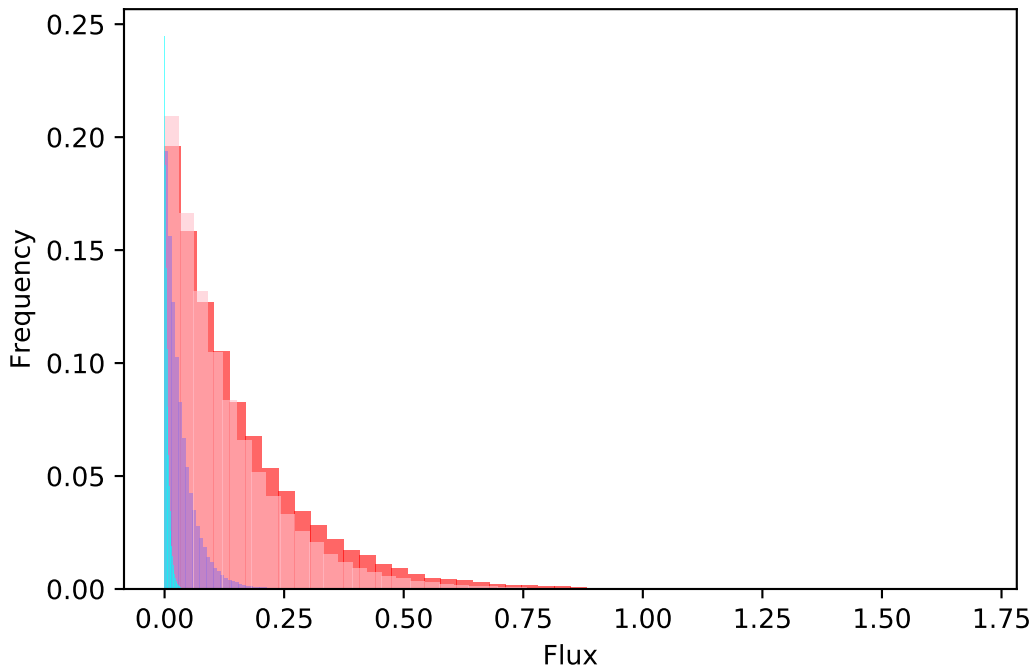
482 : Gly_c -->
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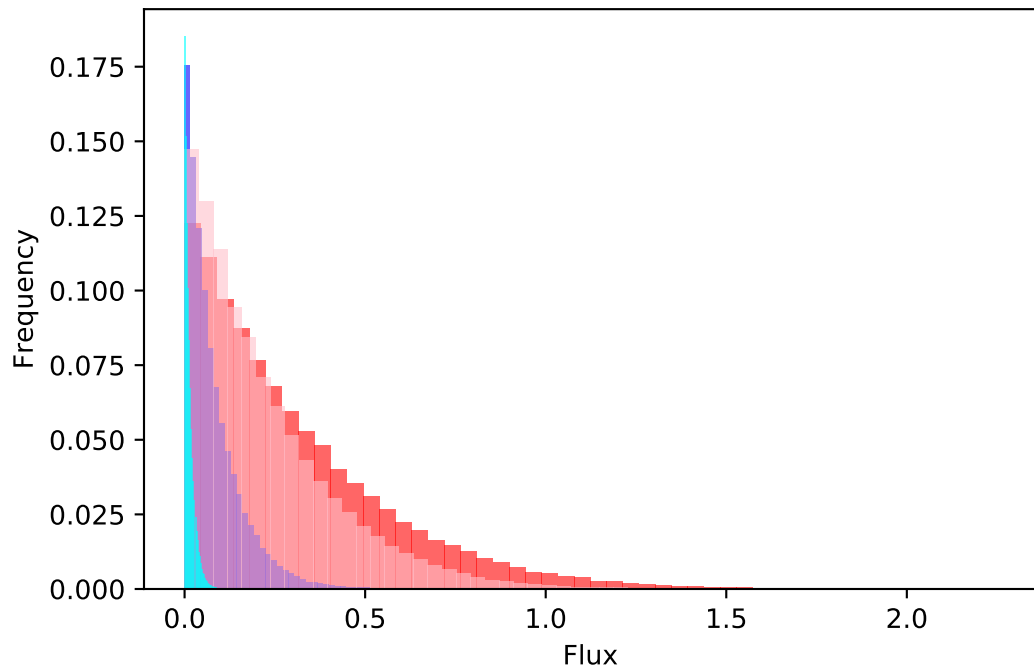
483 : Gly_h -->
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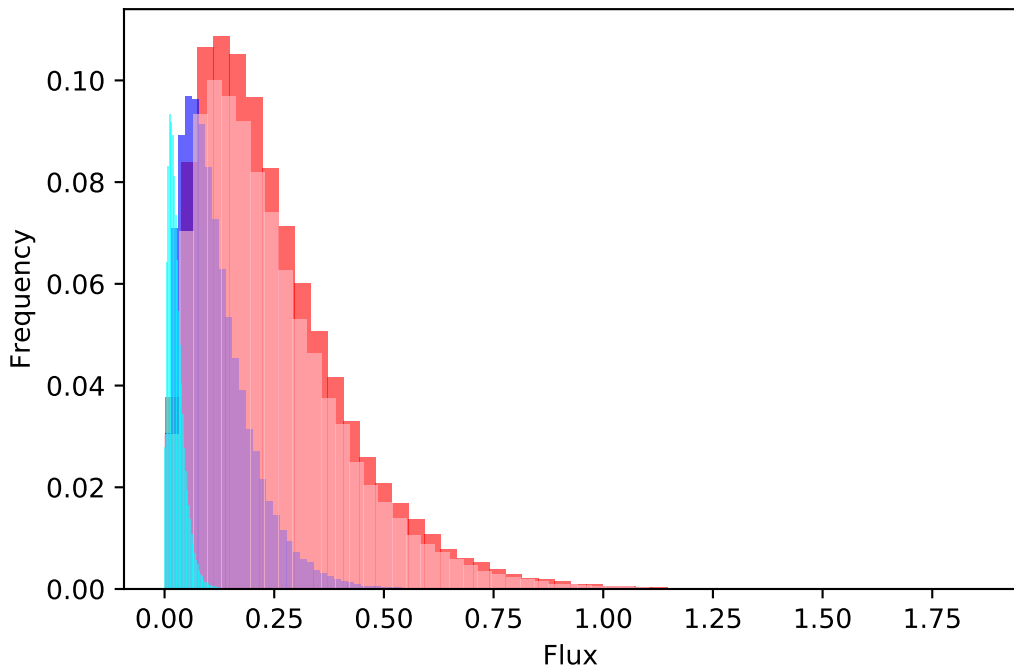
484 : Gly_m -->
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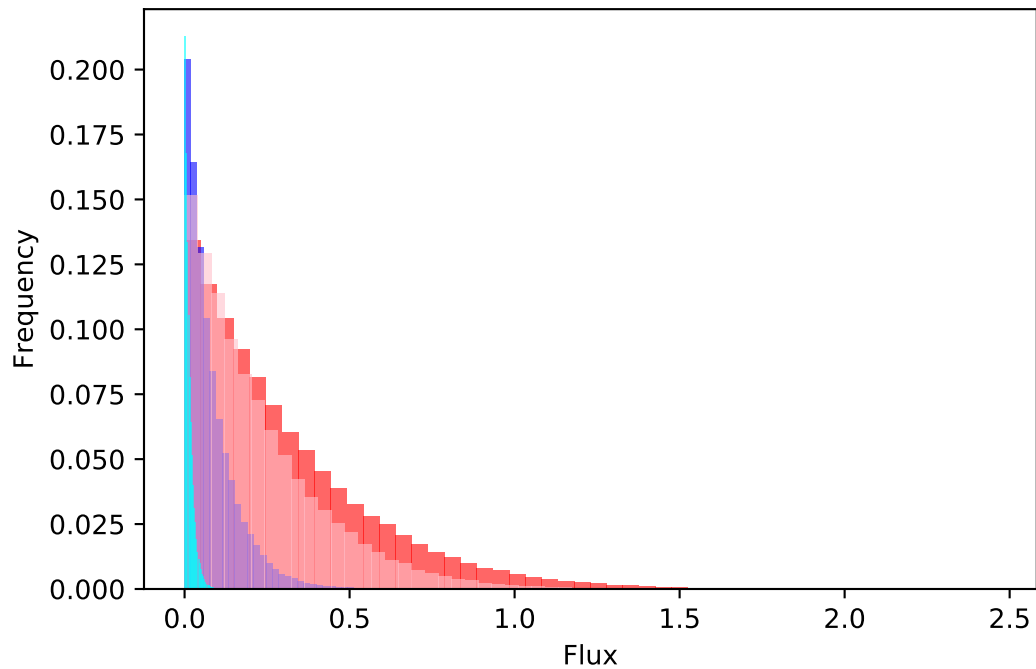
485 : Gly_p -->
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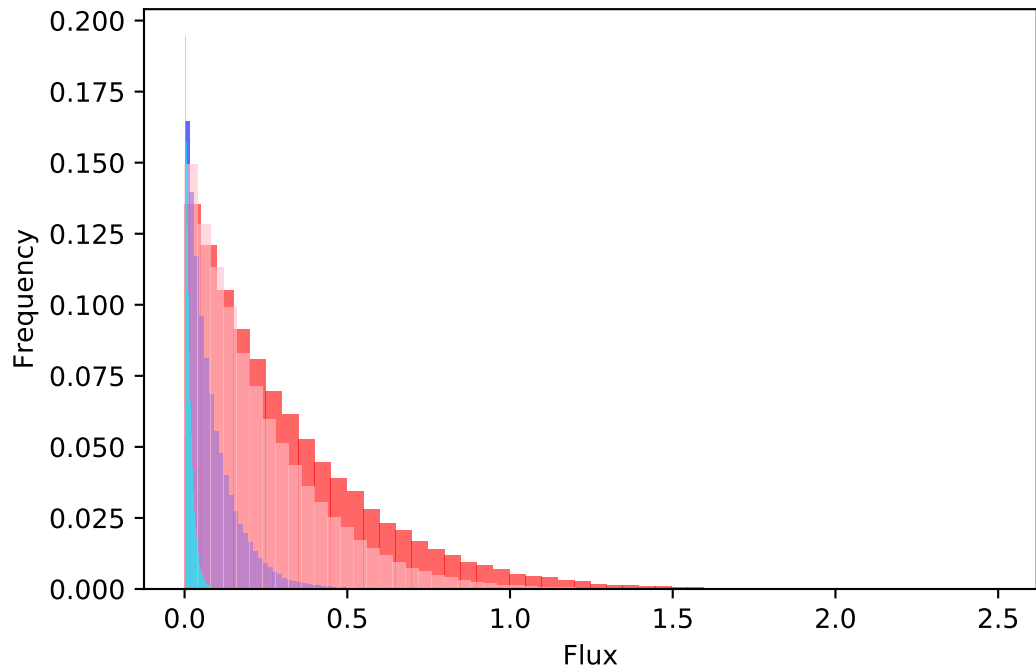
486 : His_c -->
['-']

487 : His_h -->
['-']

488 : His_m -->
['-']

489 : His_p -->
['-']

490 : Ile_c -->
['-']

491 : Ile_h -->
['-']

492 : Ile_m -->
['-']
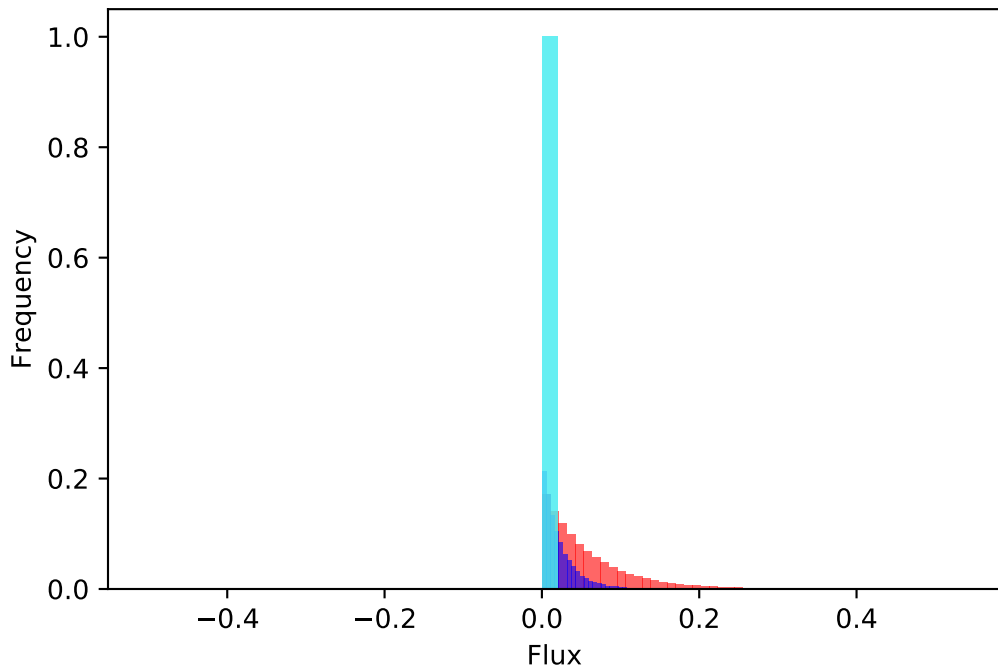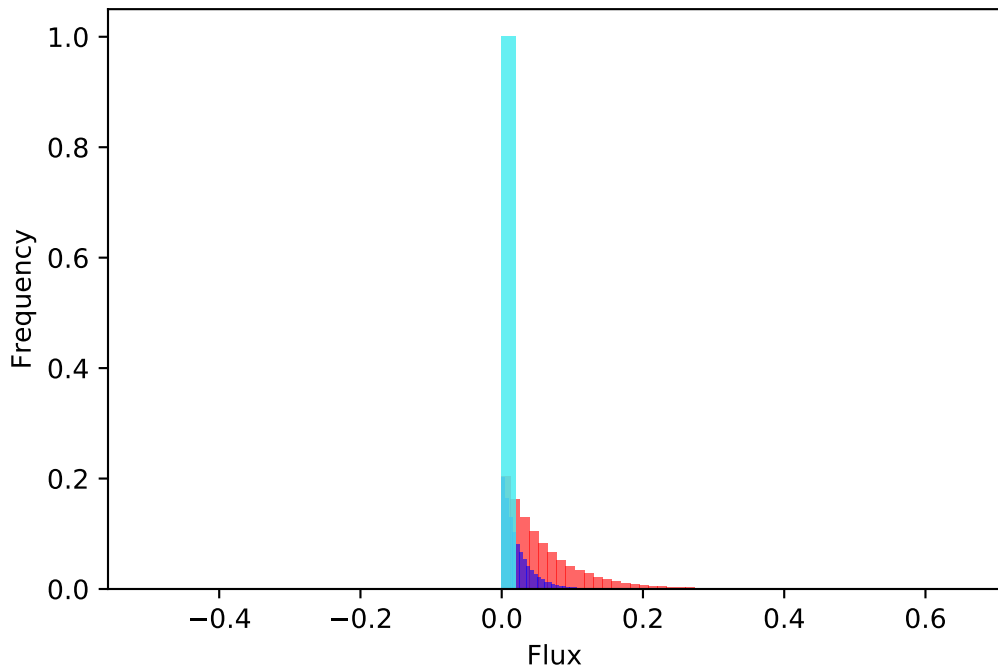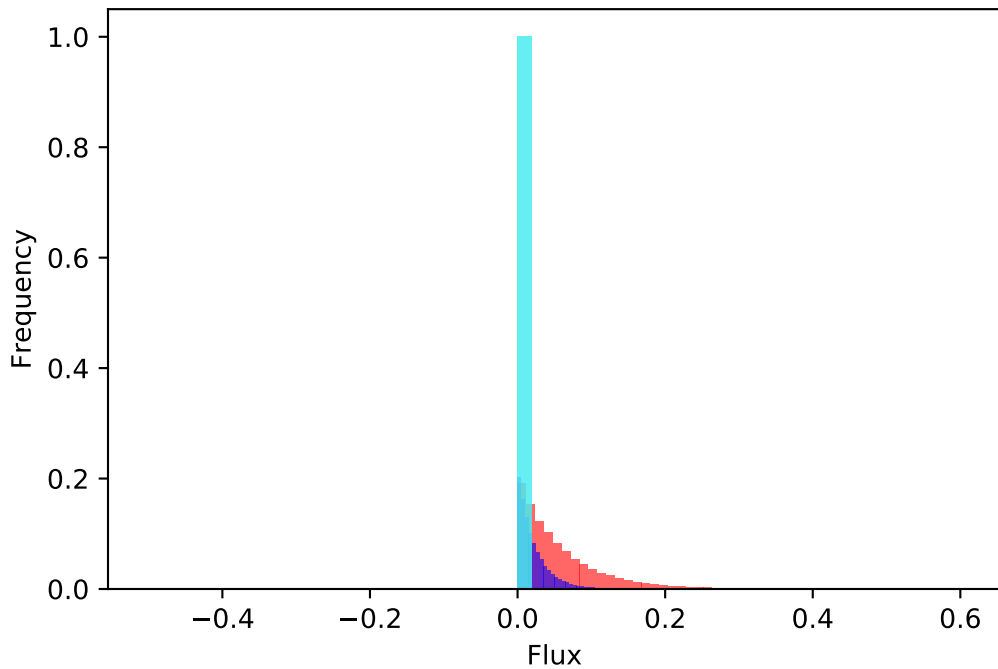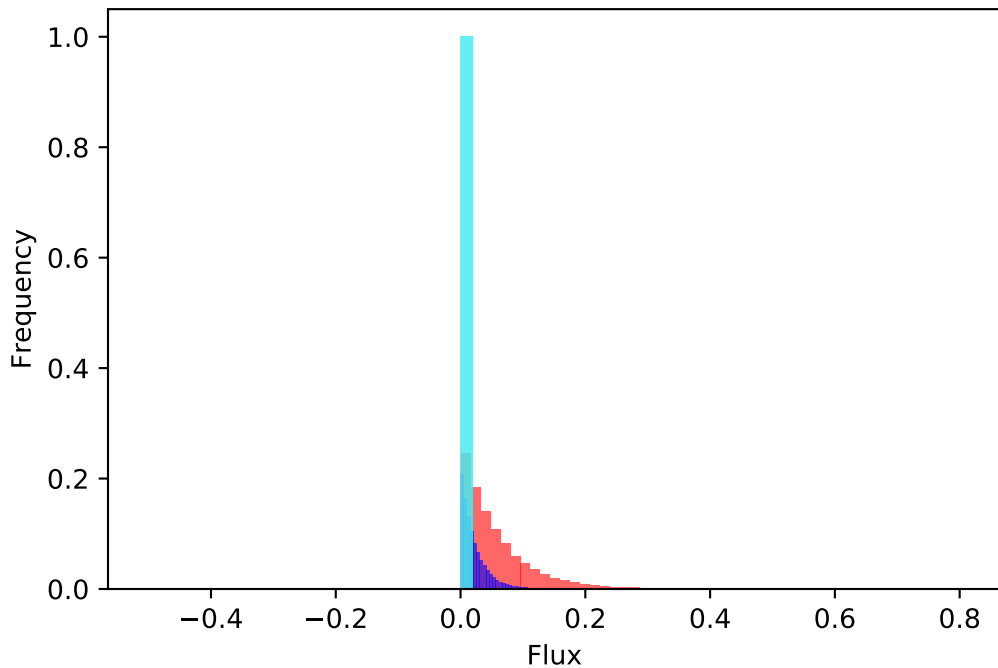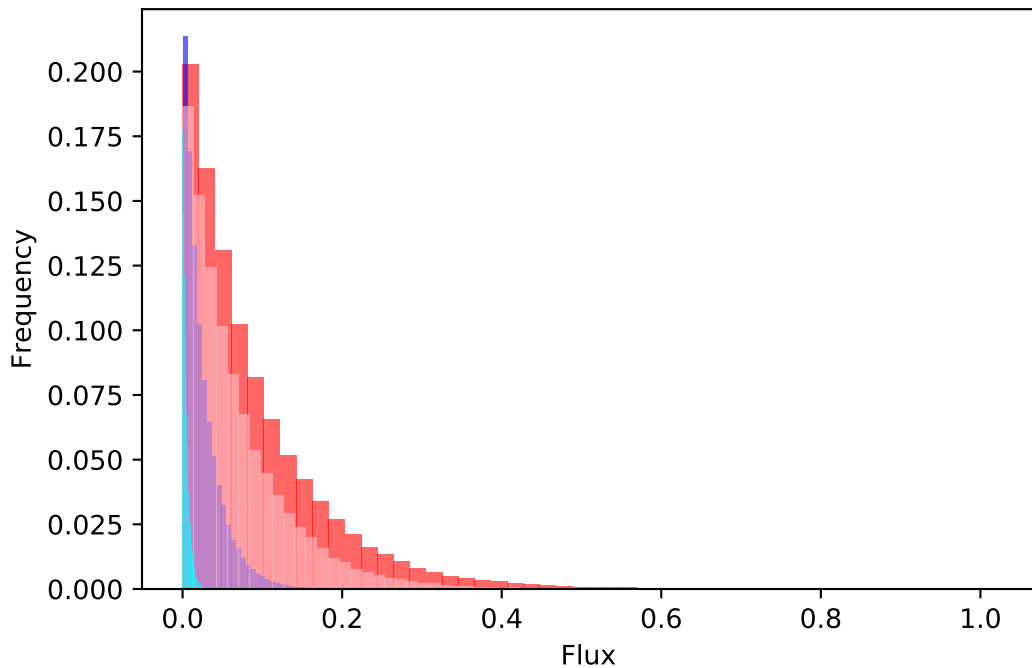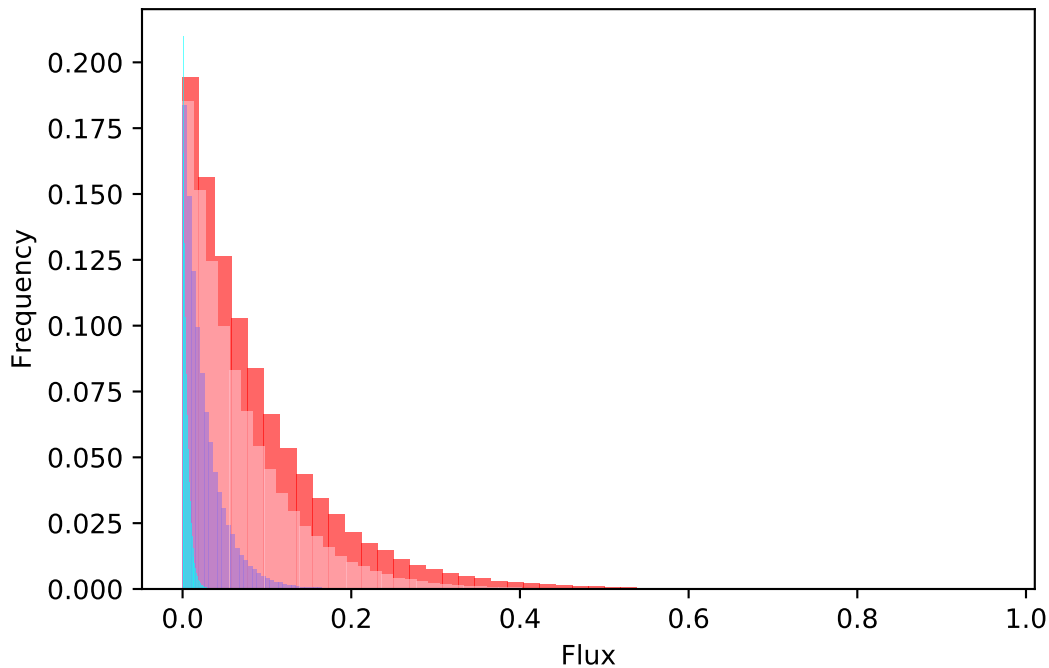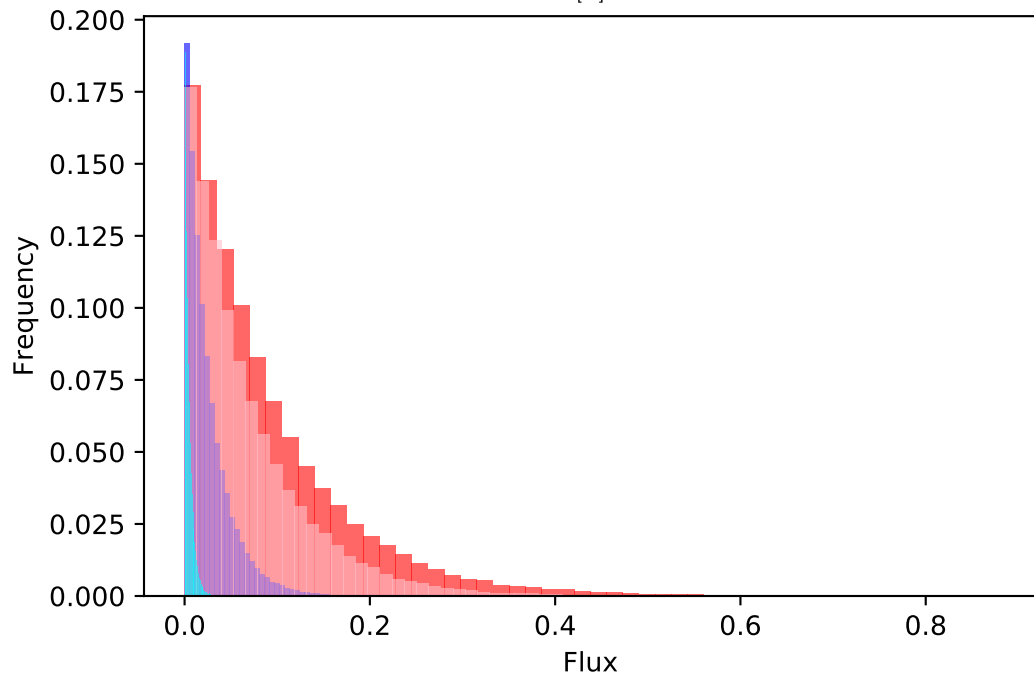
493 : Ile_p -->
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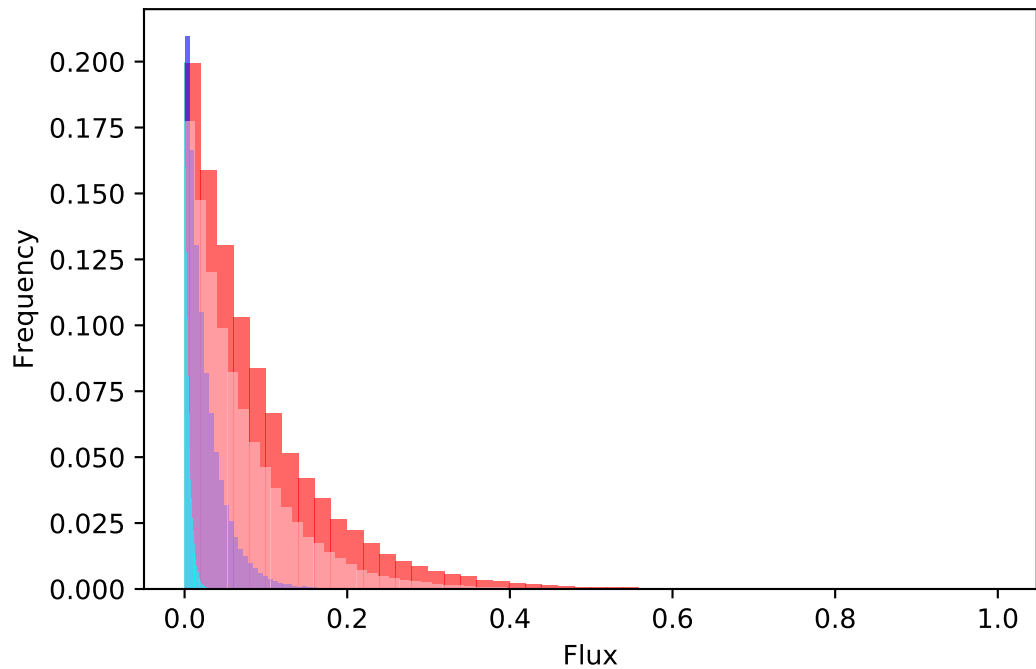
494 : Leu_c -->
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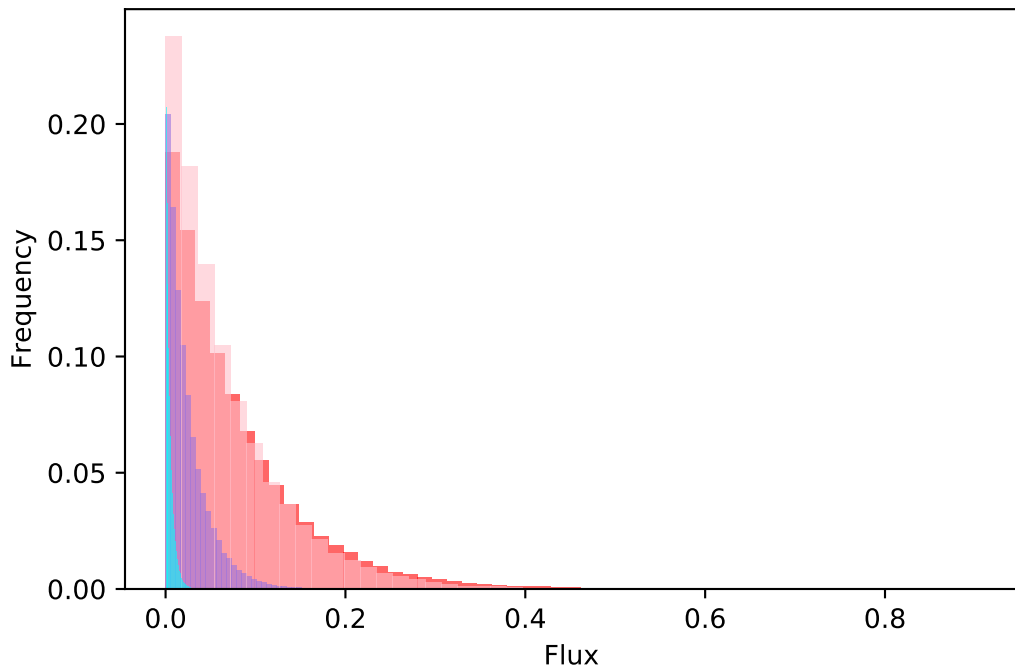
495 : Leu_h -->
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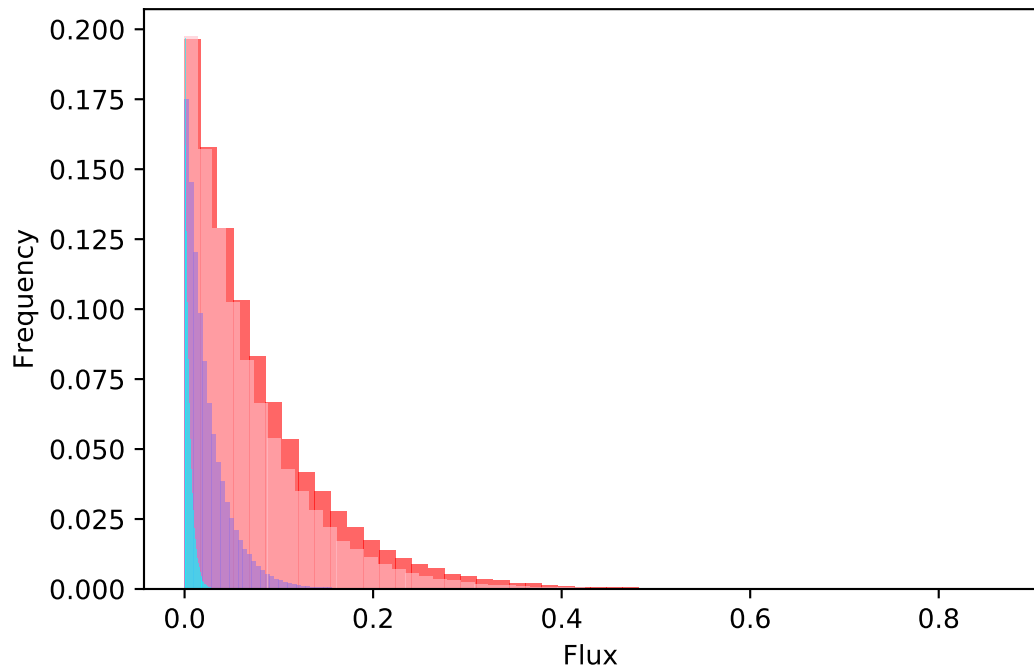
496 : Leu_m -->
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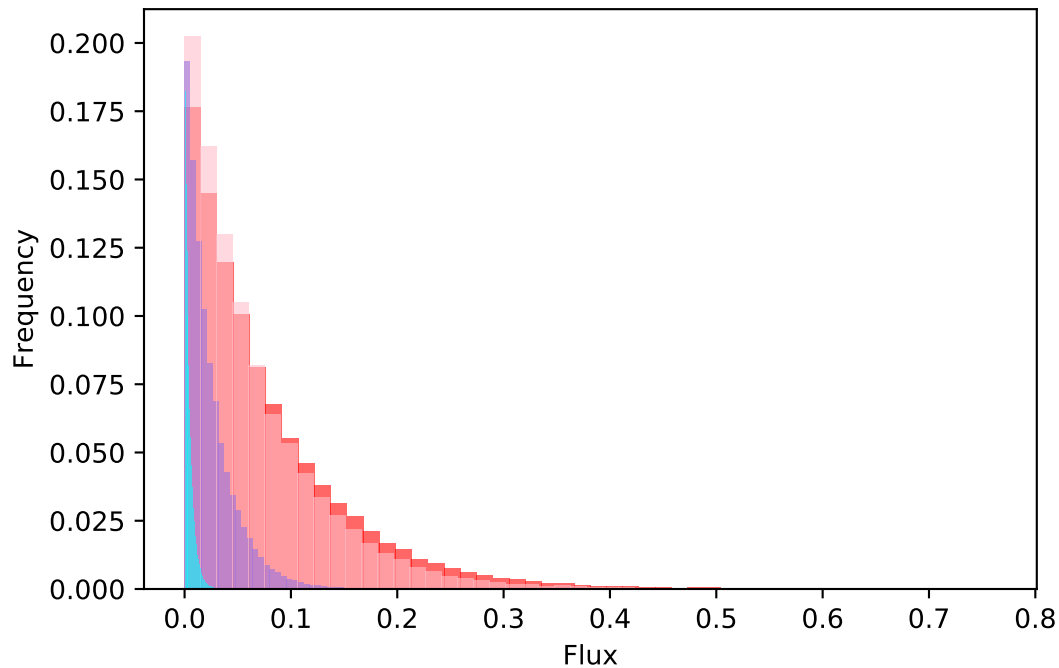
497 : Leu_p -->
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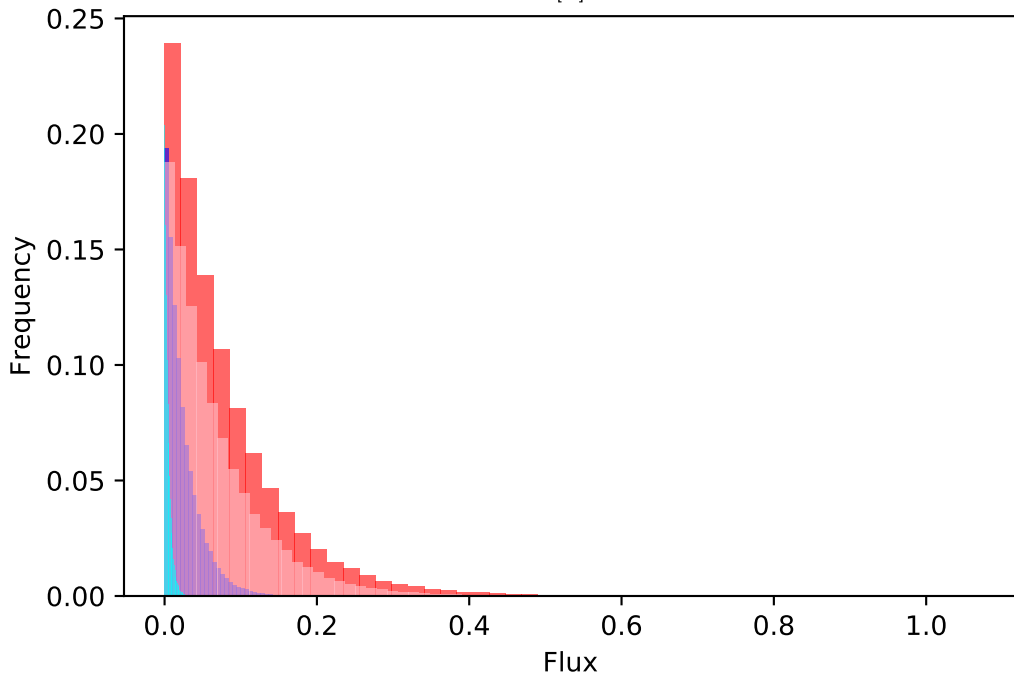
498 : Lys_c -->
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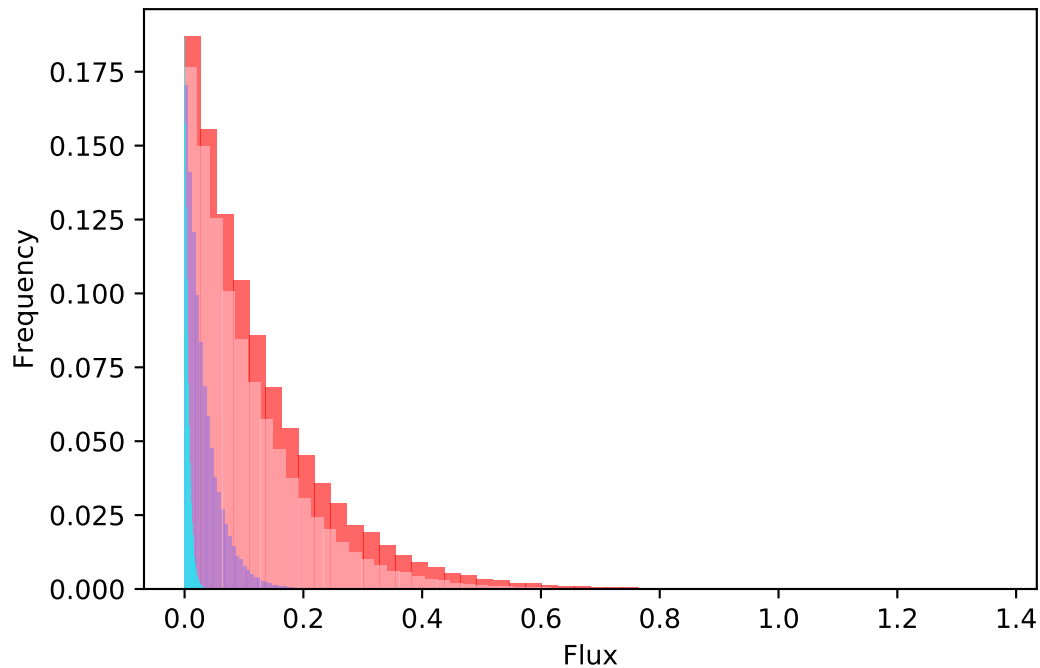
499 : Lys_h -->
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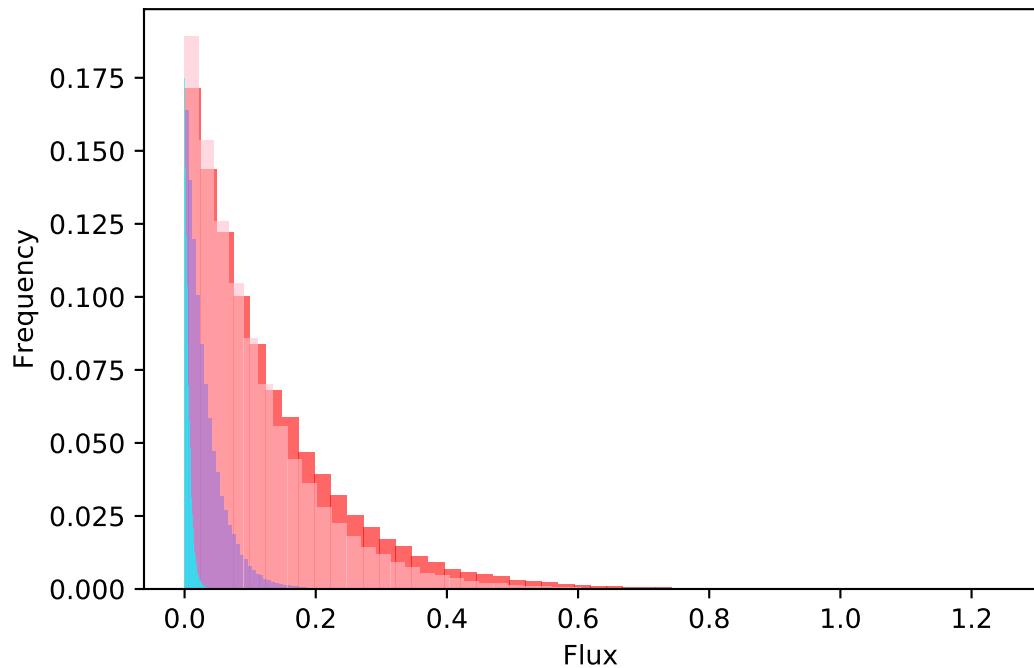
500 : Lys_m -->
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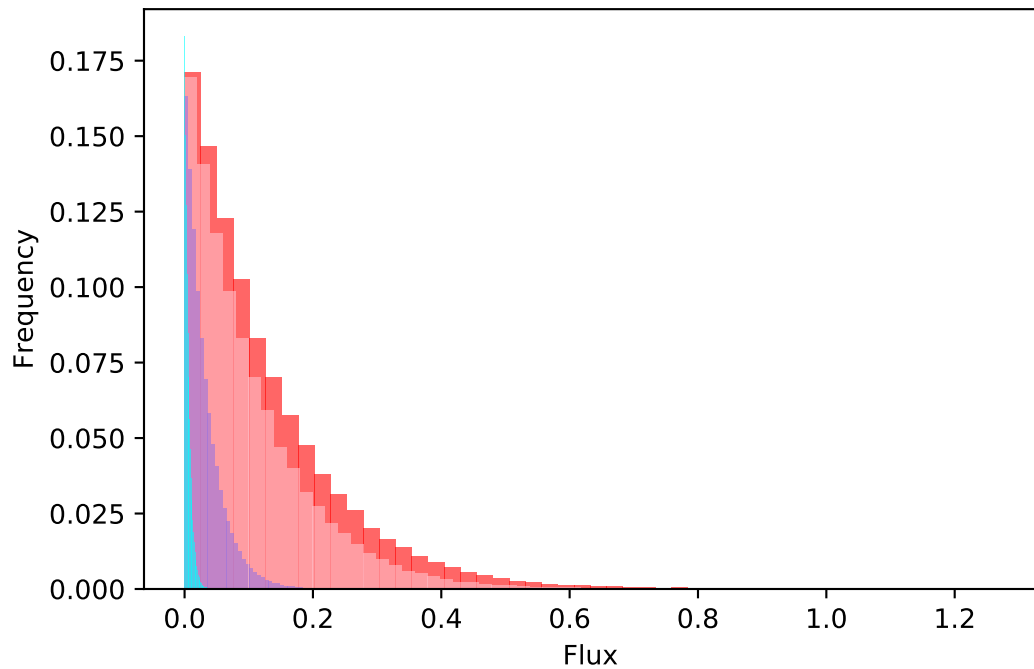
501 : Lys_p -->
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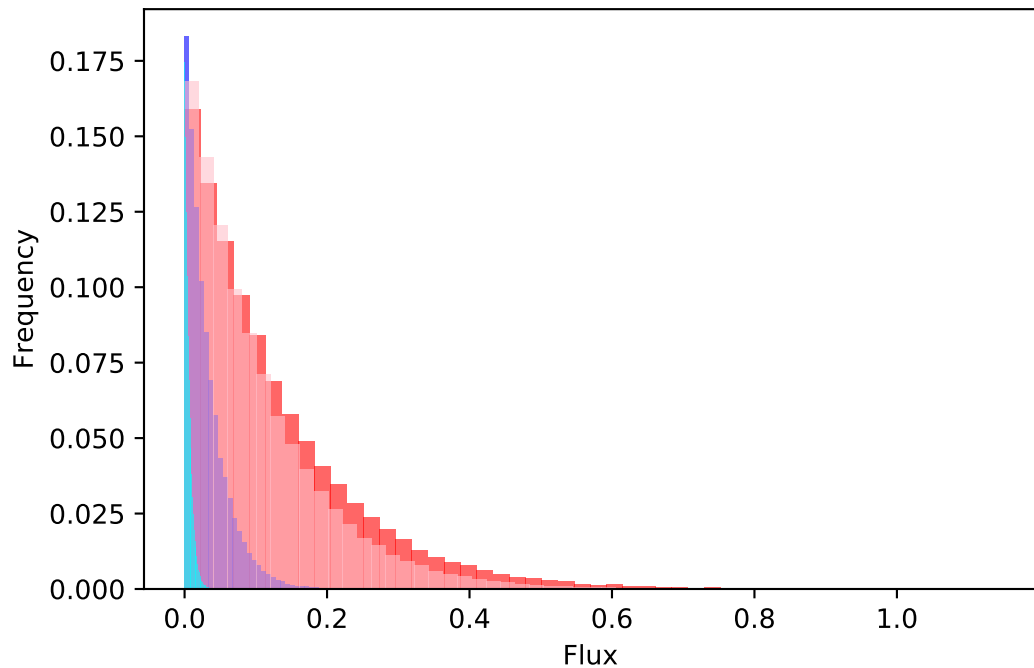
502 : Met_c -->
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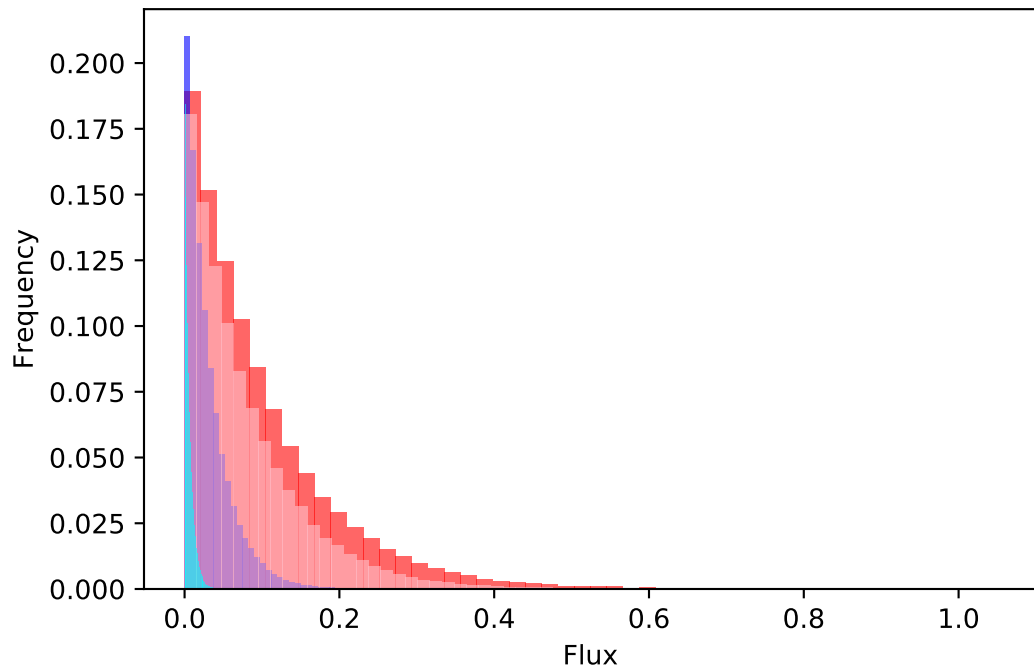
503 : Met_h -->
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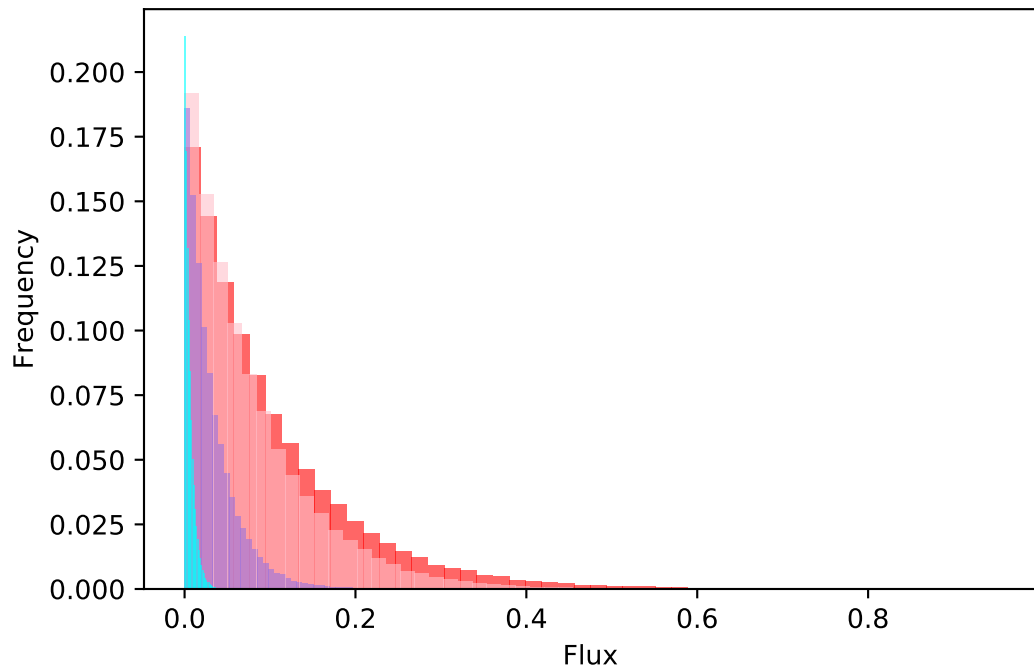
504 : Met_m -->
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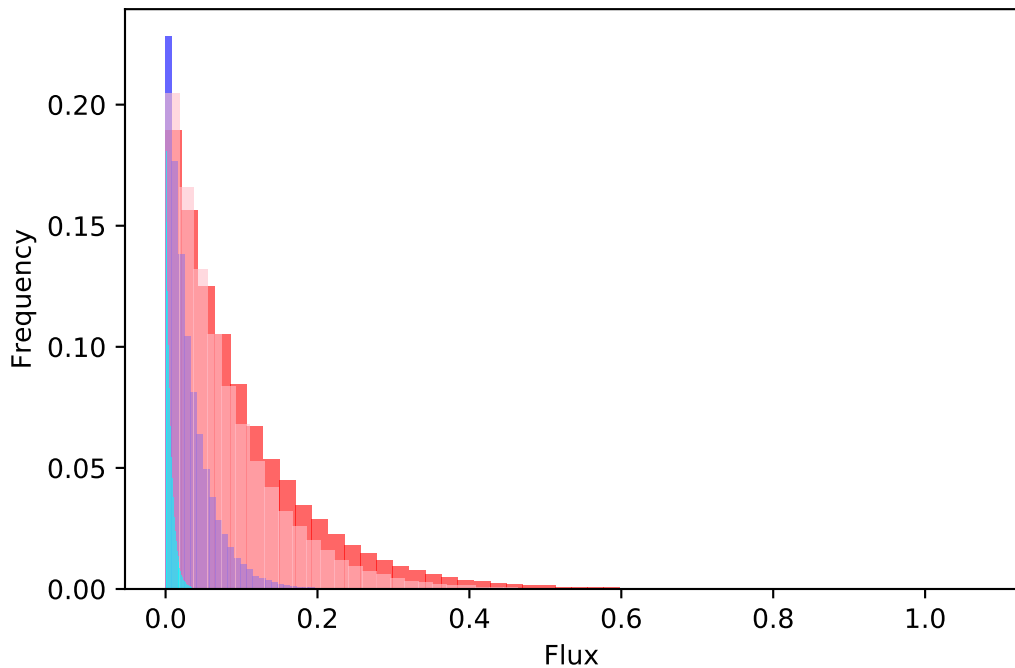
505 : Met_p -->
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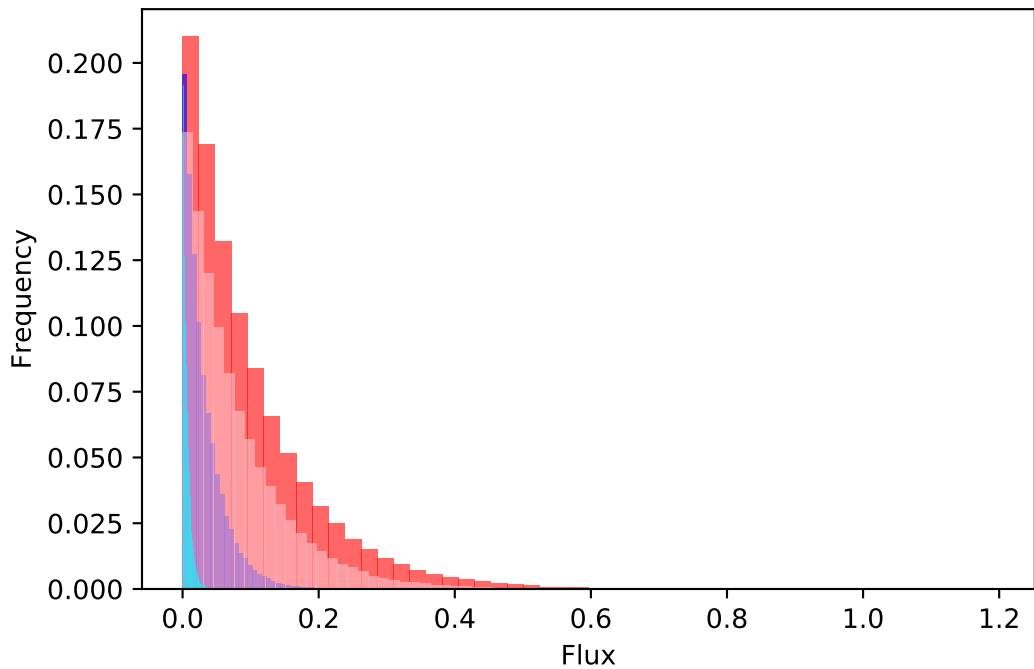
506 : Phe_c -->
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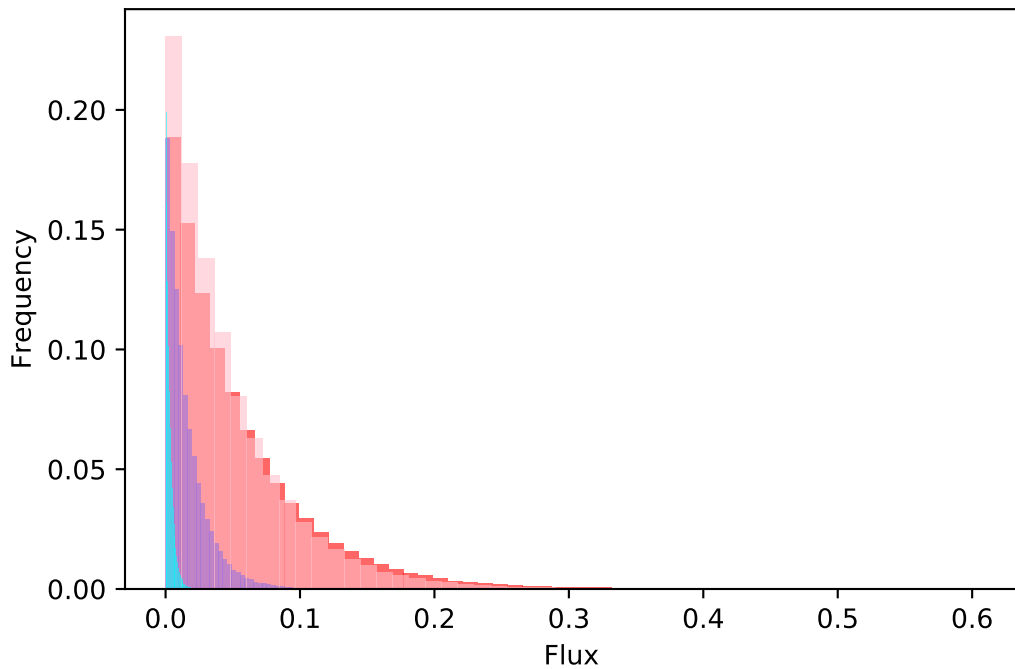
507 : Phe_h -->
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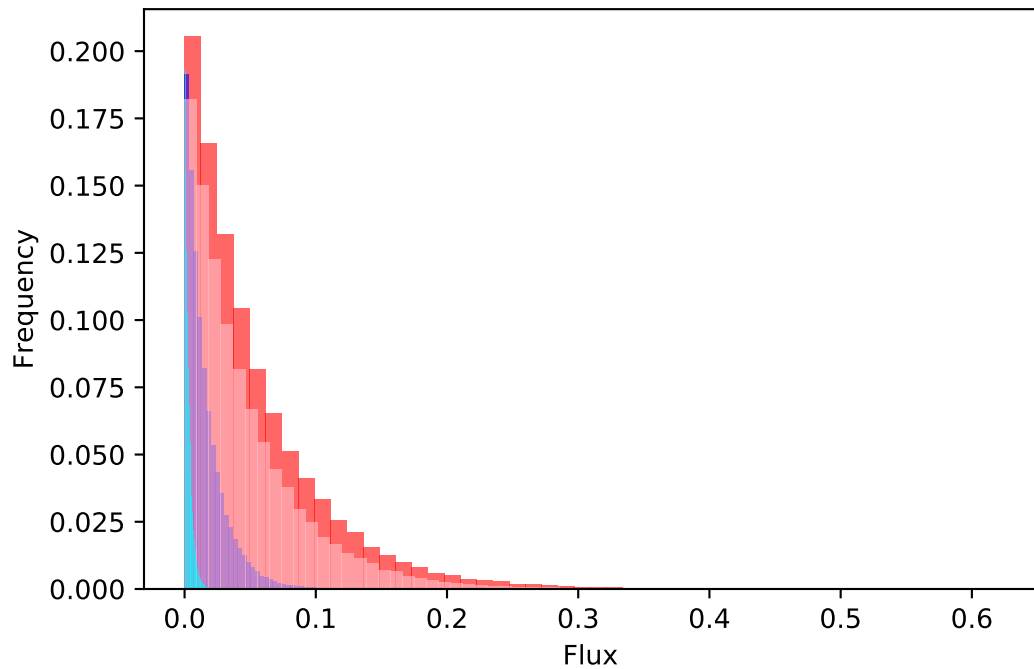
508 : Phe_m -->
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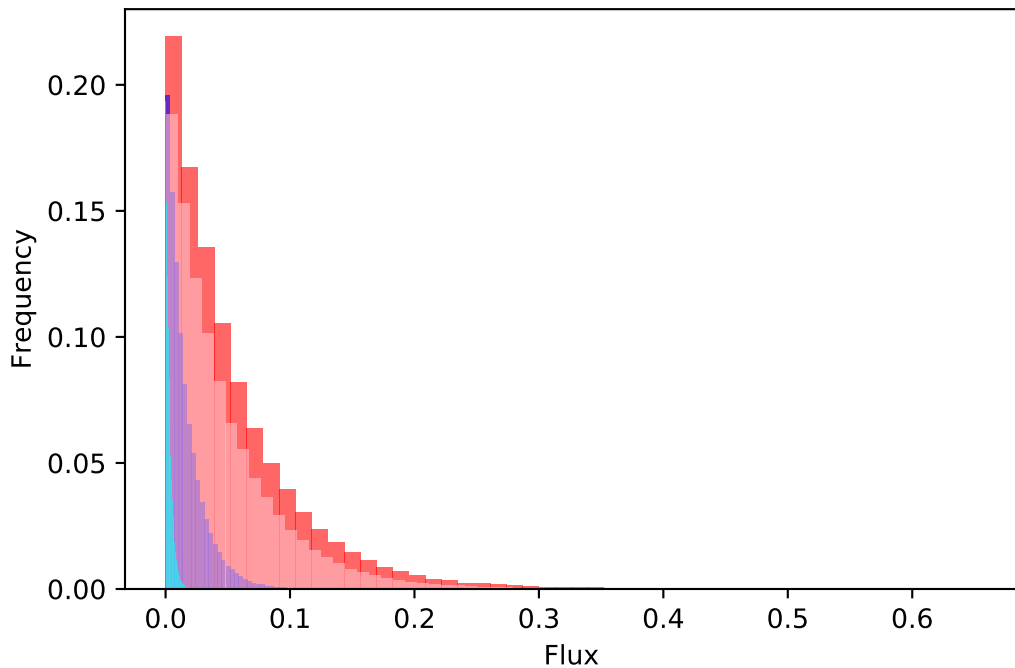
509 : Phe_p -->
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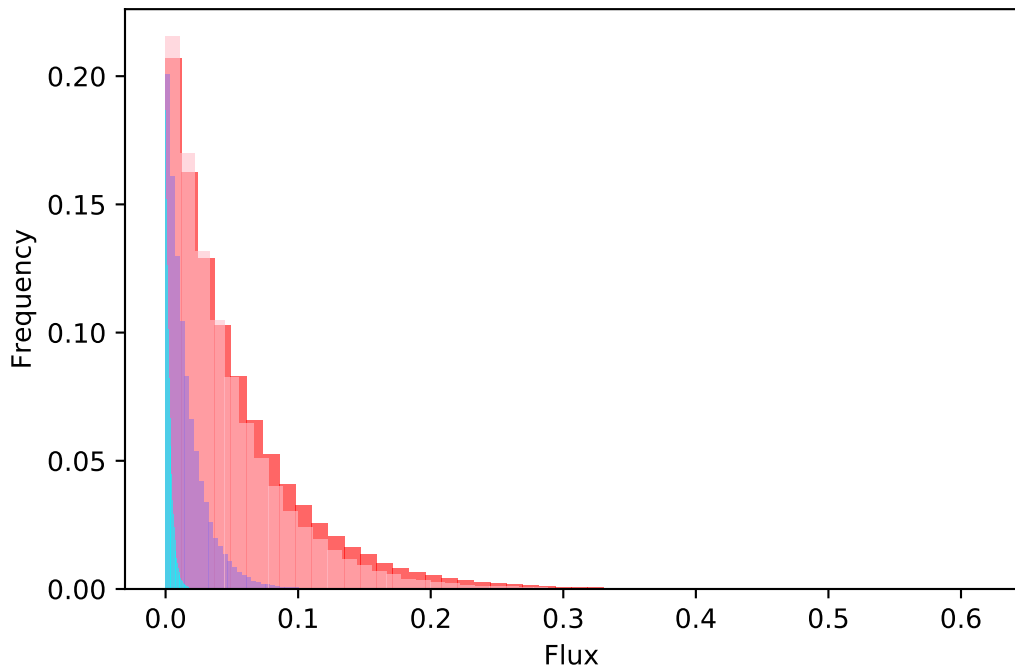
510 : Pro_c -->
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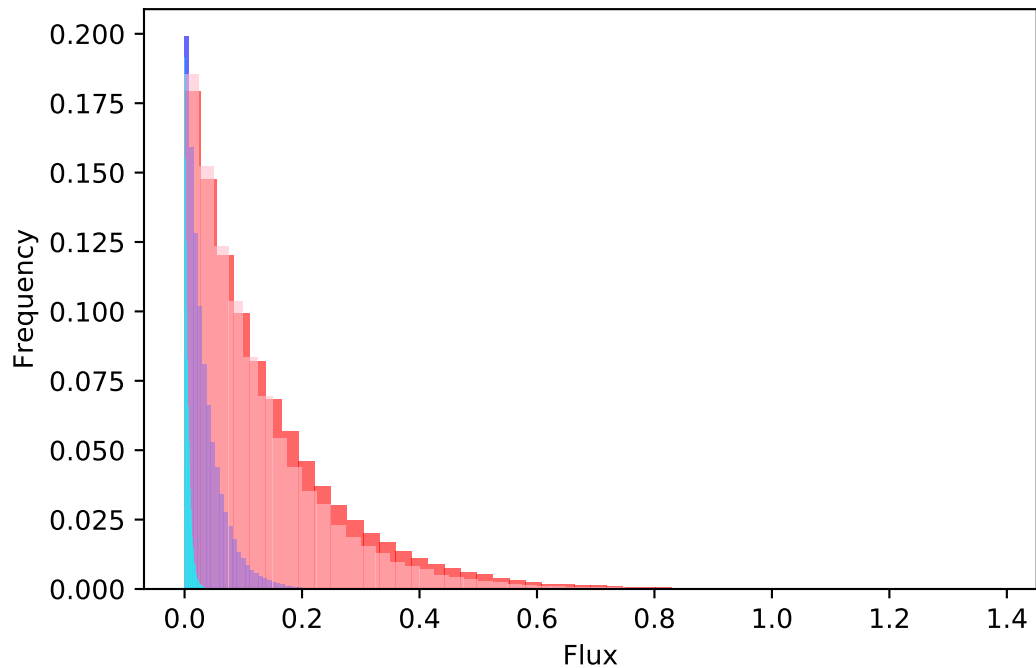
511 : Pro_h -->
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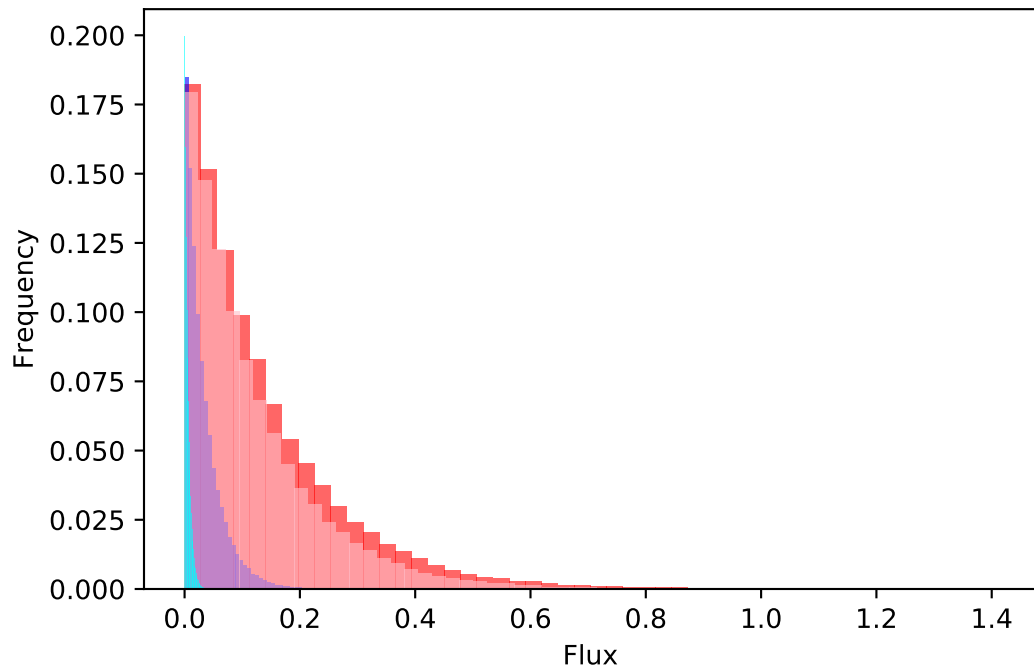
512 : Pro_m -->
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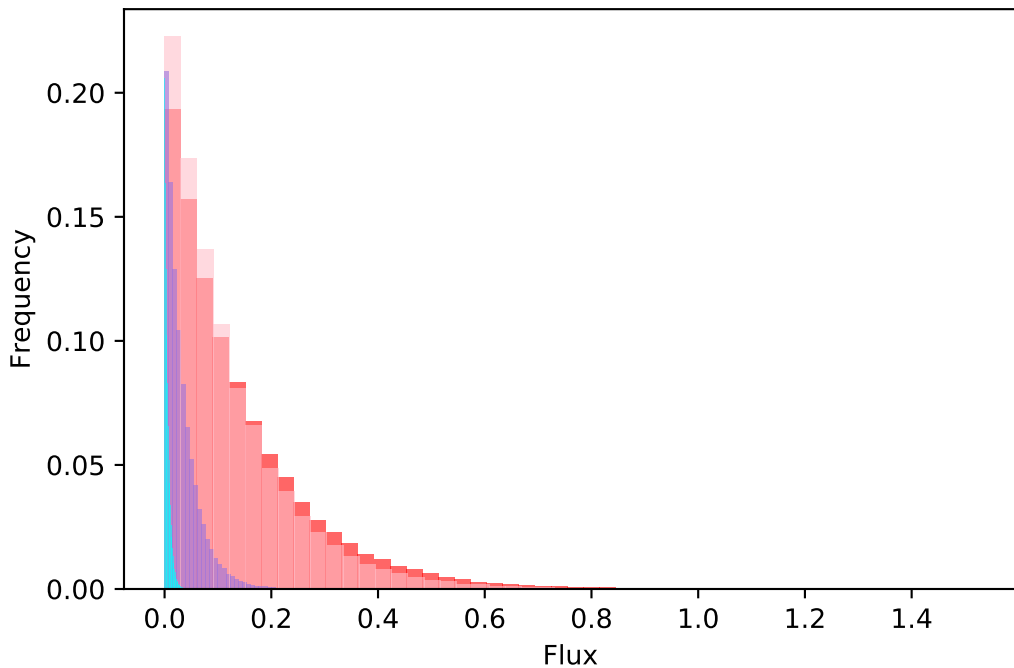
513 : Pro_p -->
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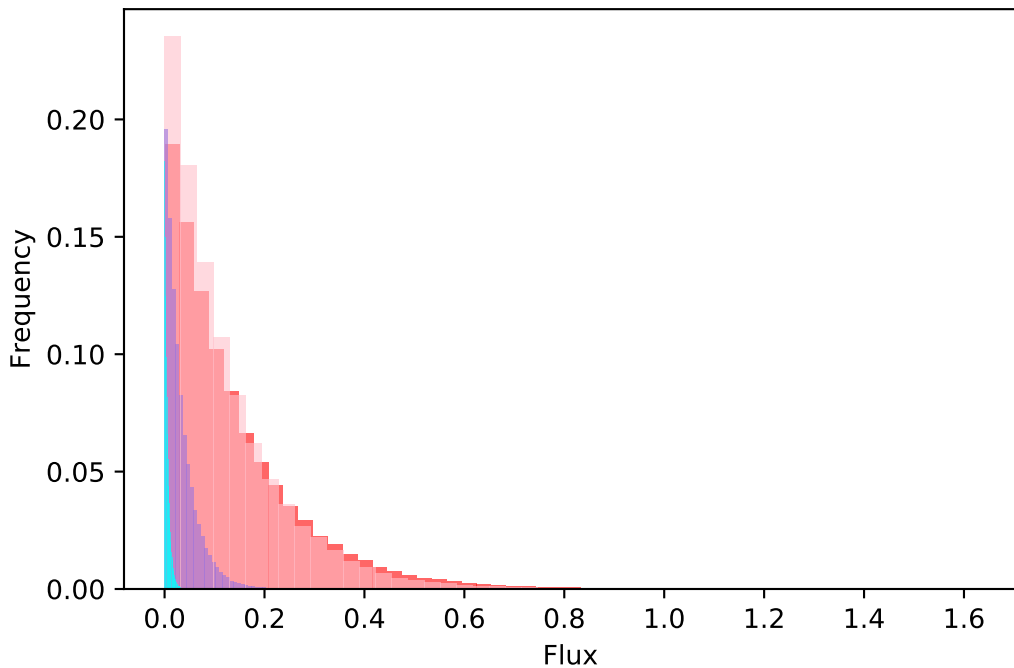
514 : Ser_c -->
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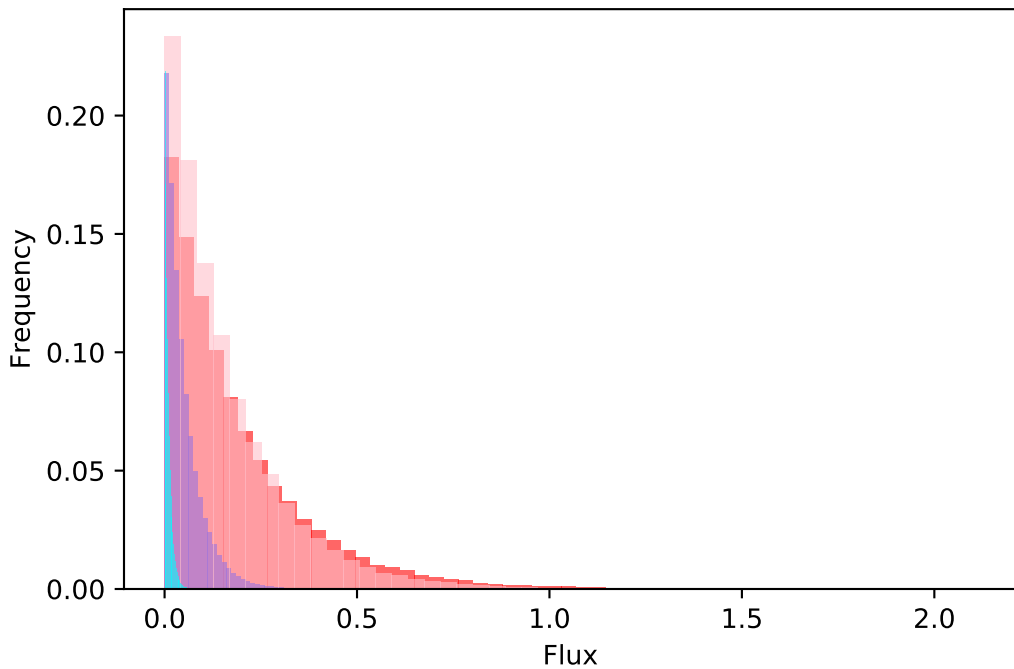
515 : Ser_h -->
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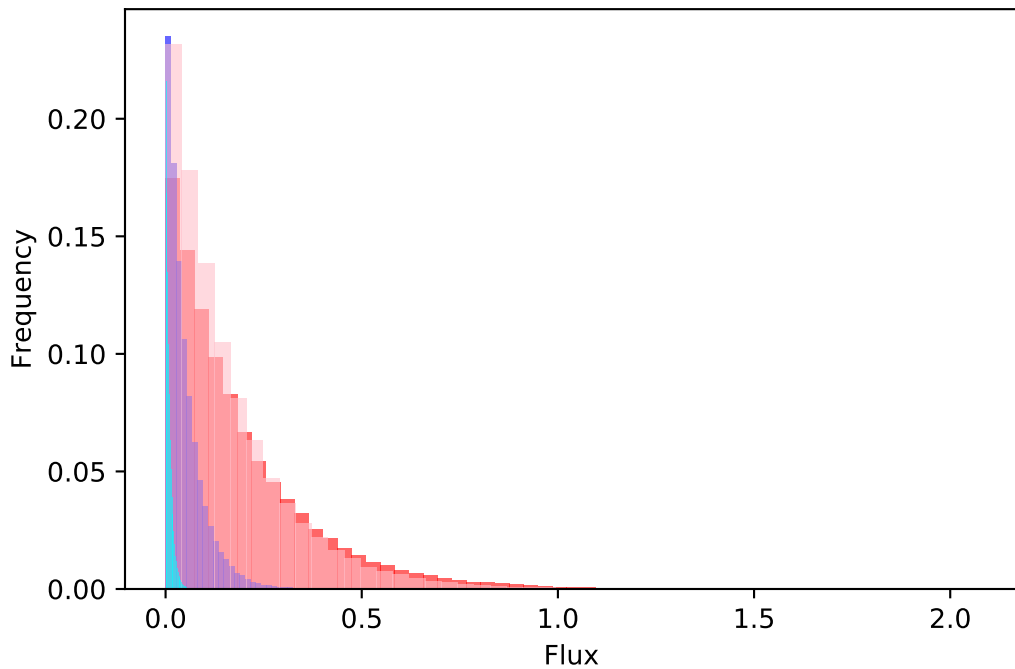
516 : Ser_m -->
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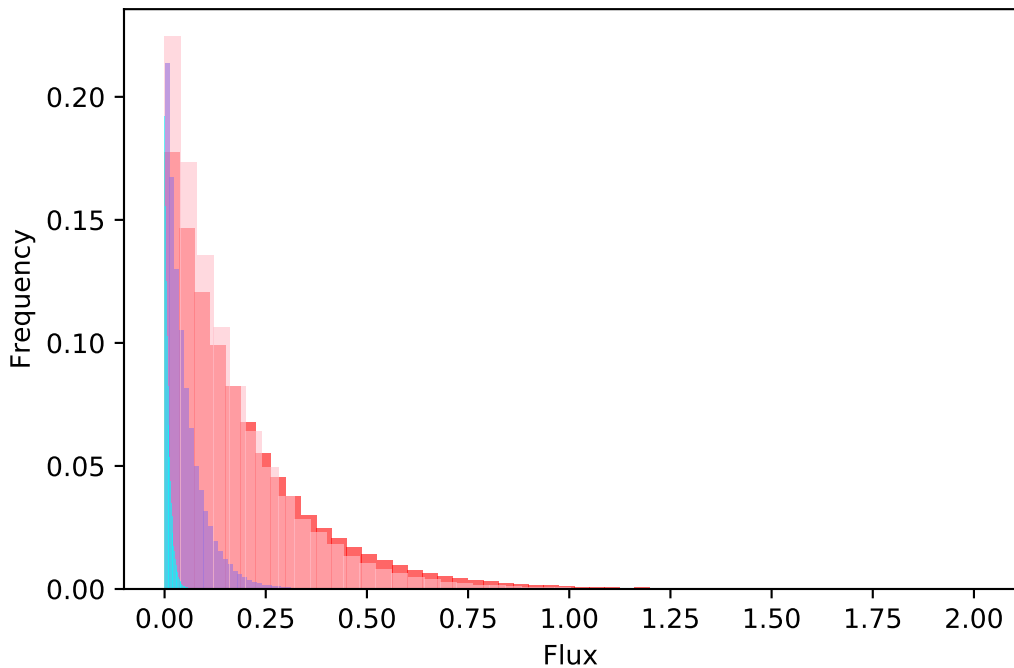
517 : Ser_p -->
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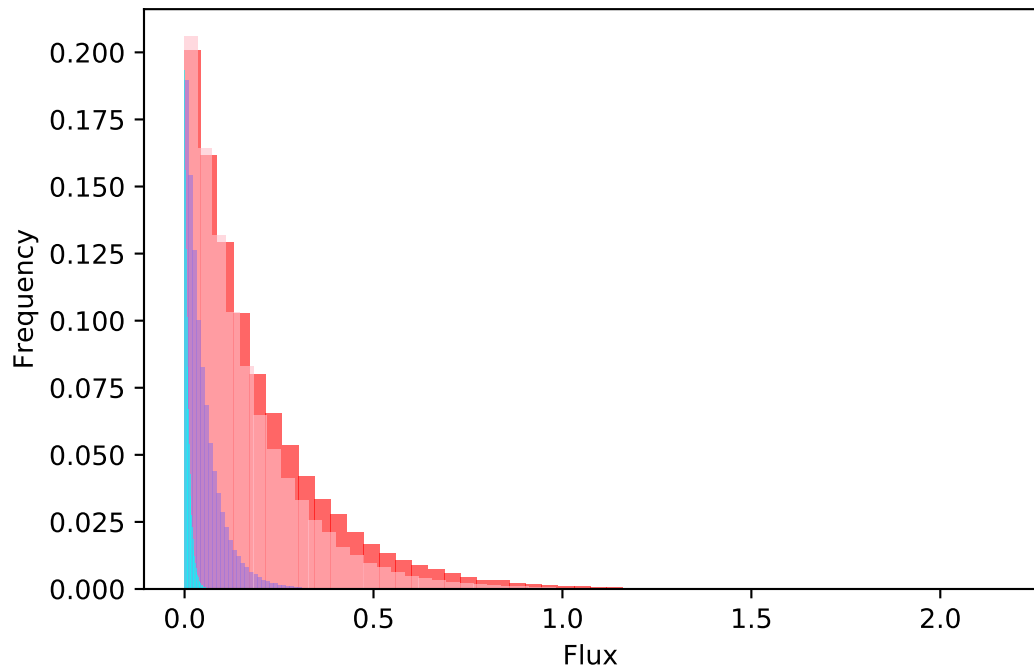
518 : Thr_c -->
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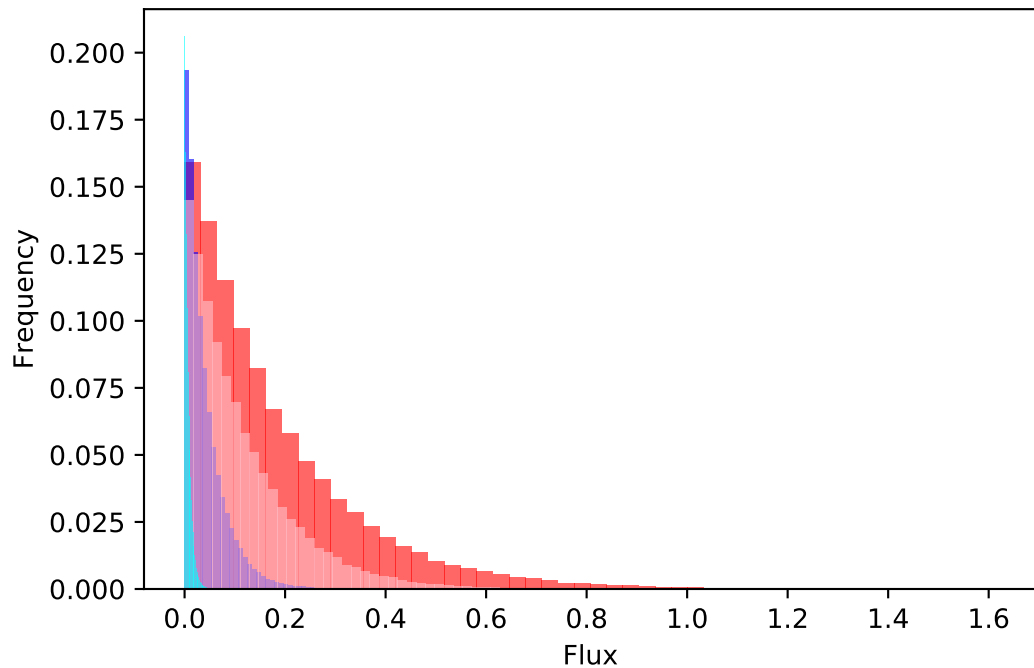
519 : Thr_h -->
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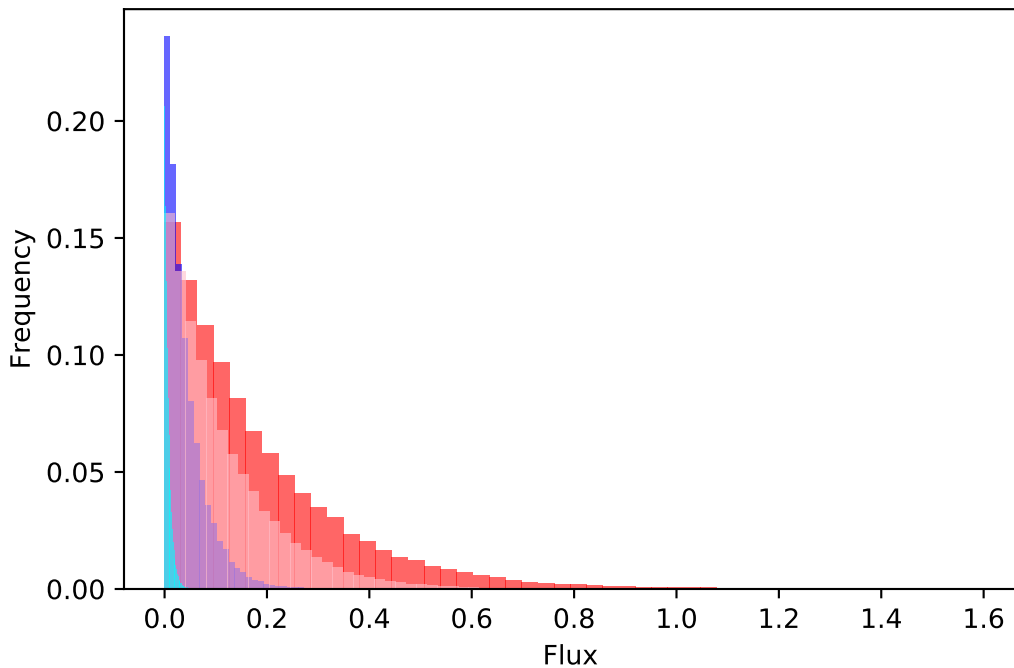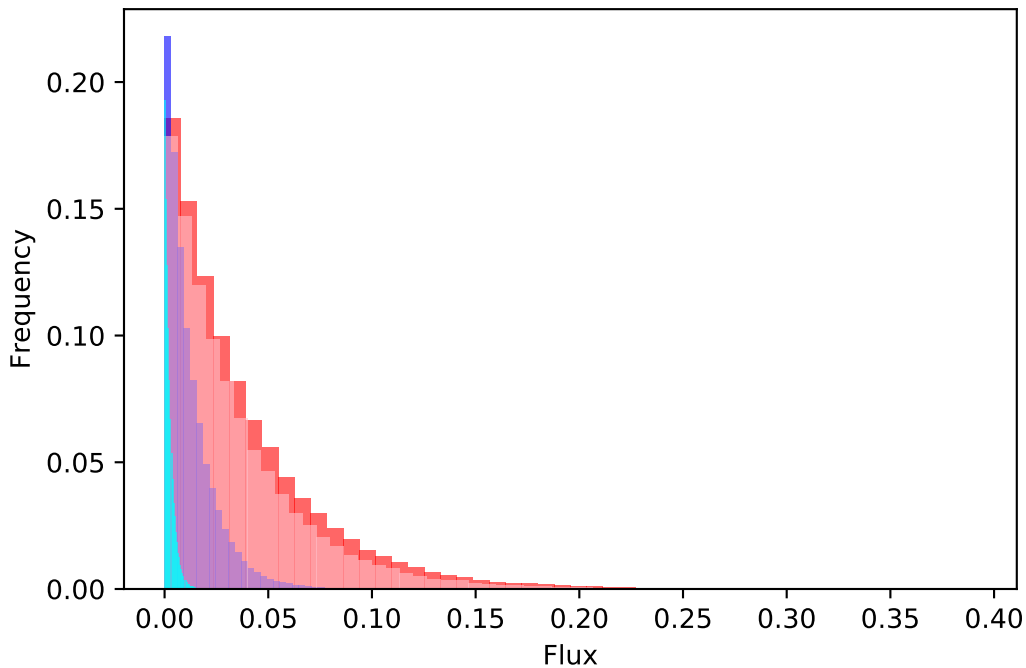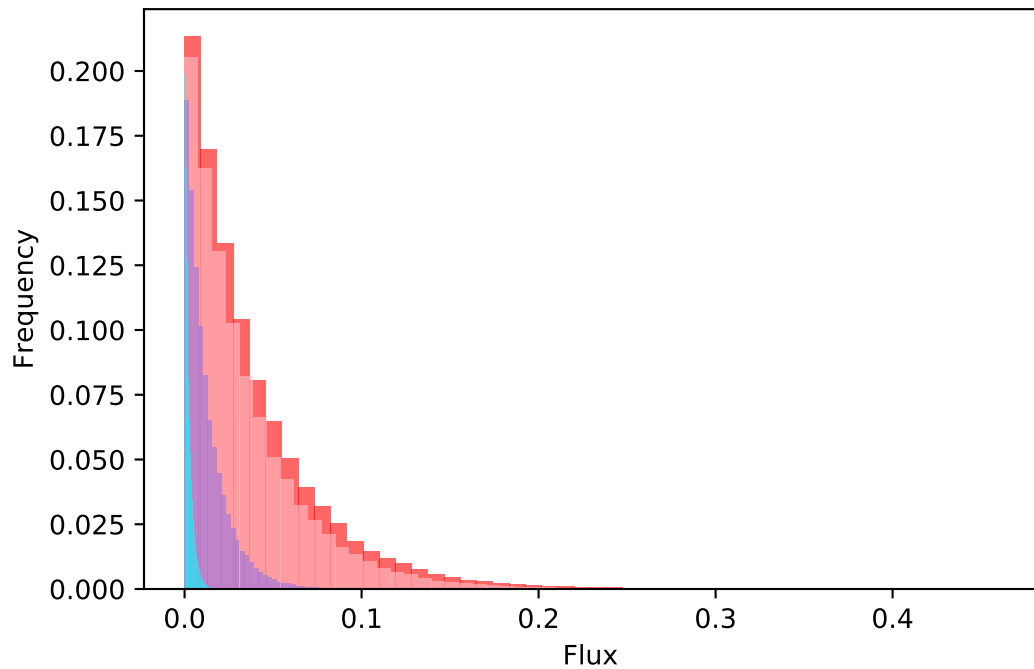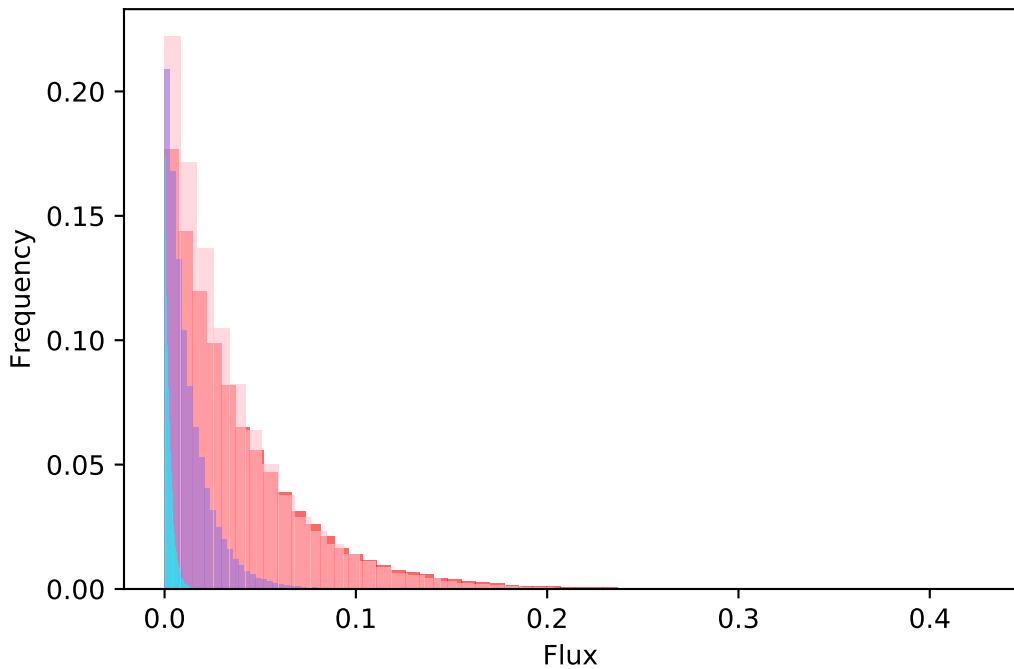
520 : Thr_m -->
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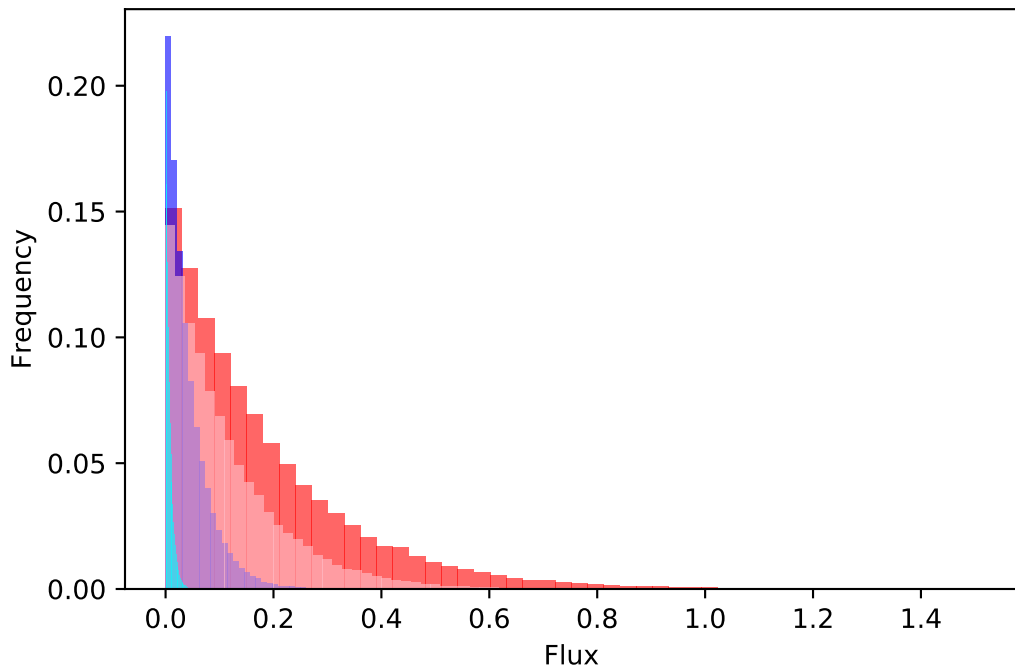
521 : Thr_p -->
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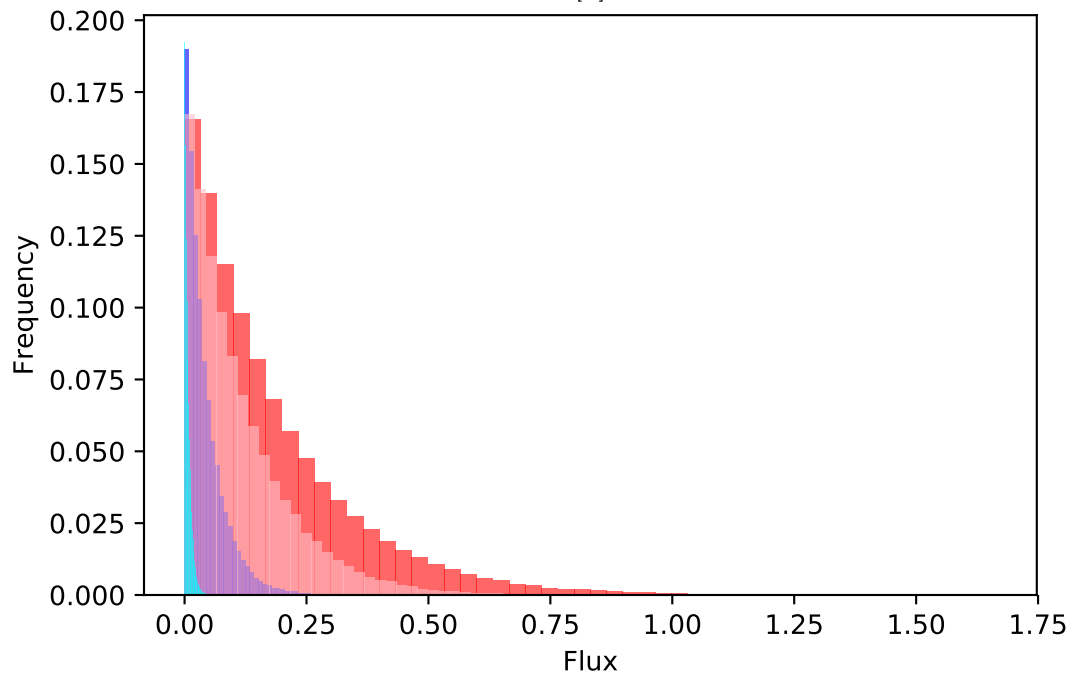
522 : Trp_c -->
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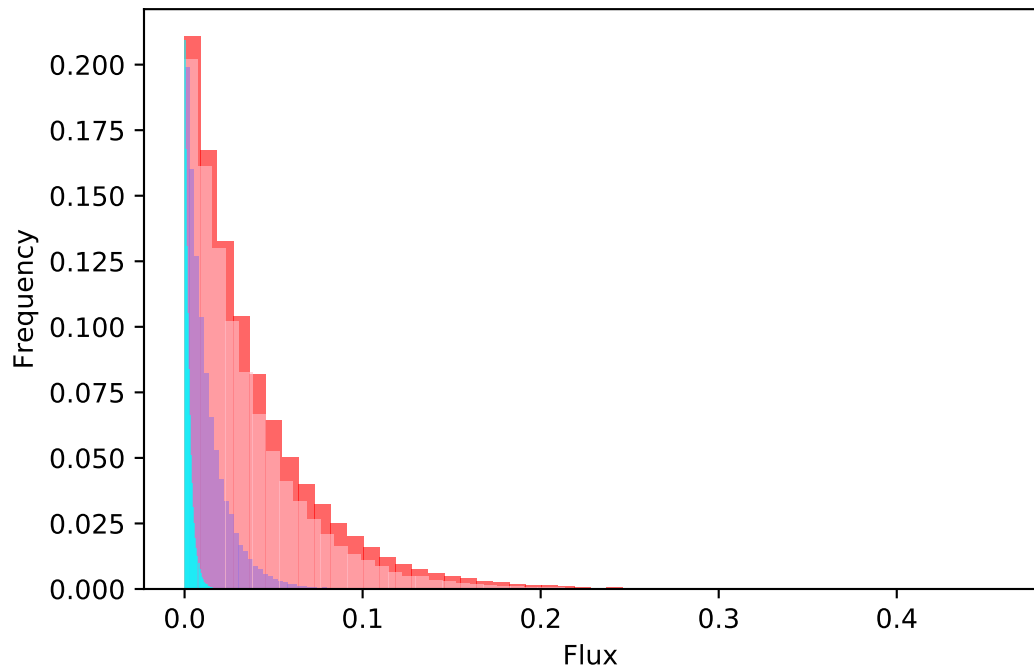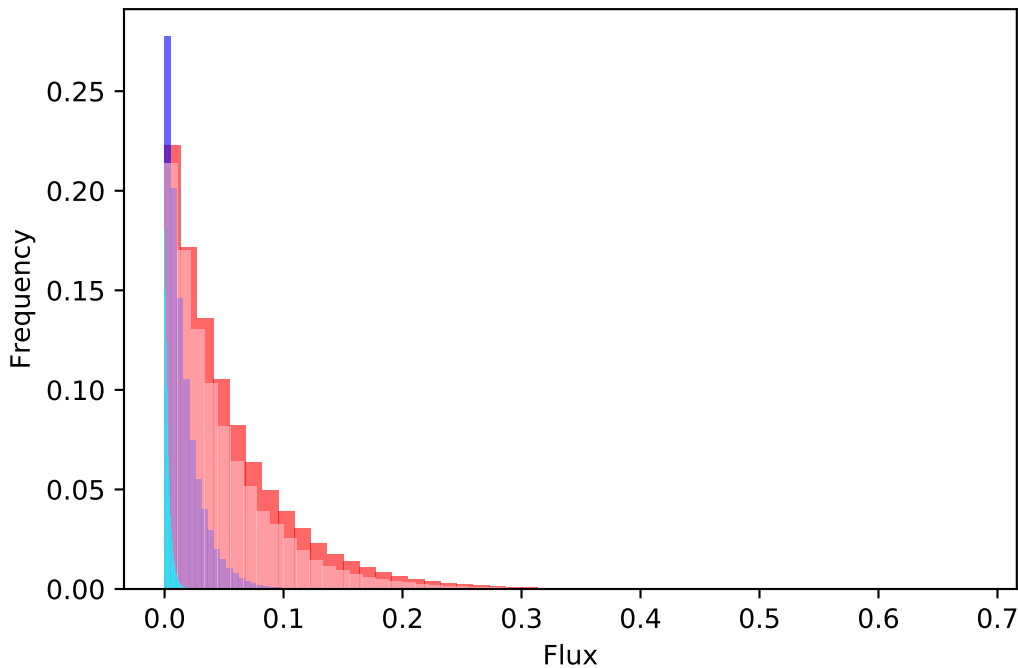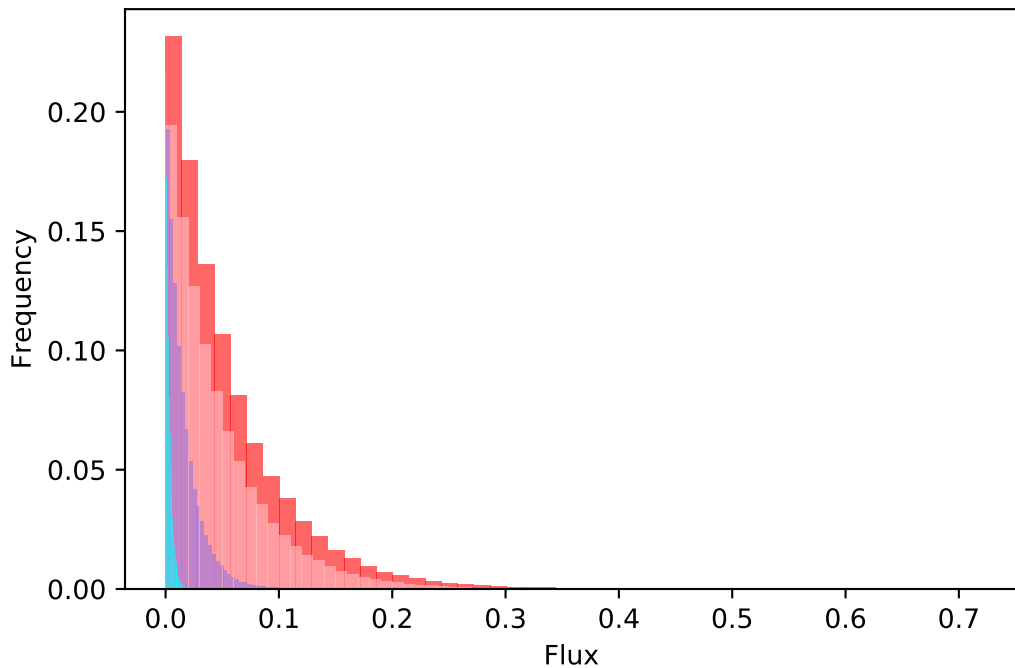
523 : Trp_h -->
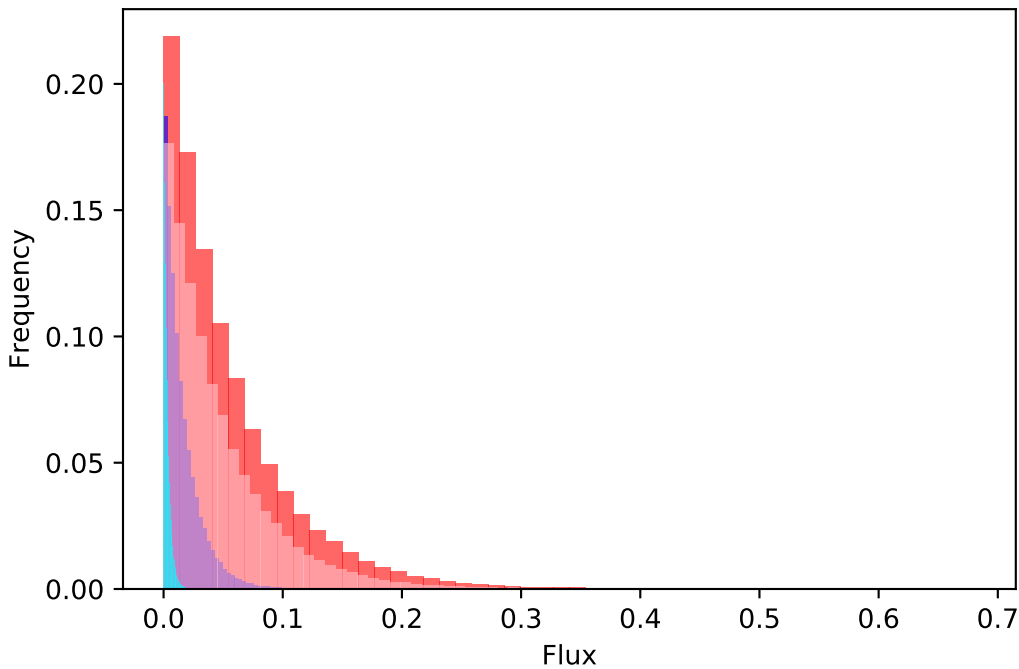['-']

524 : Trp_m -->
['-']

525 : Trp_p -->
['-']

526 : Tyr_c -->
['-']

527 : Tyr_h -->
['-']

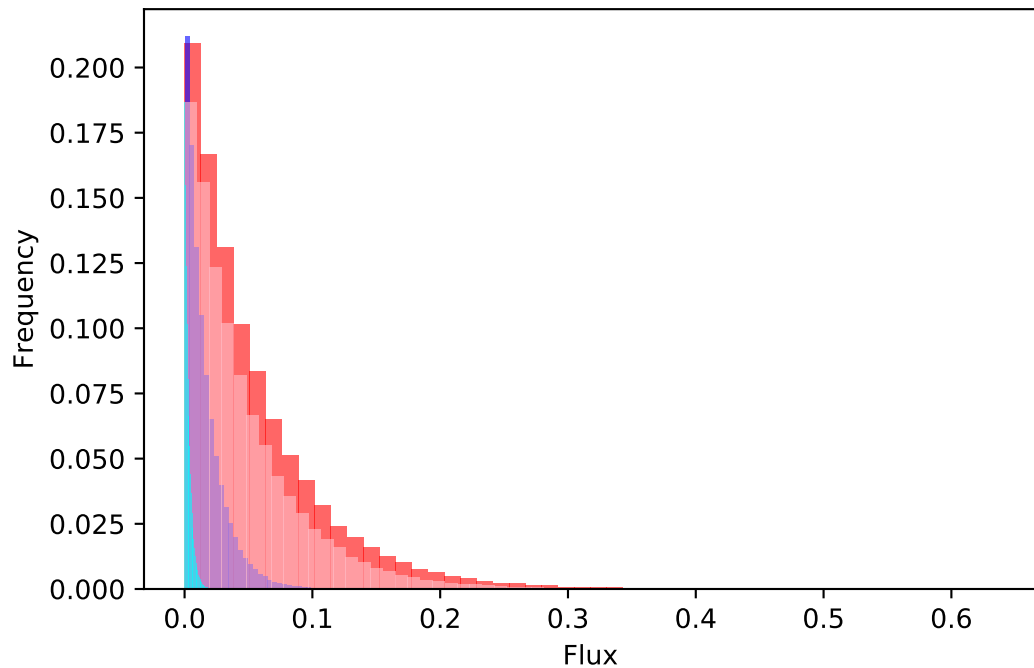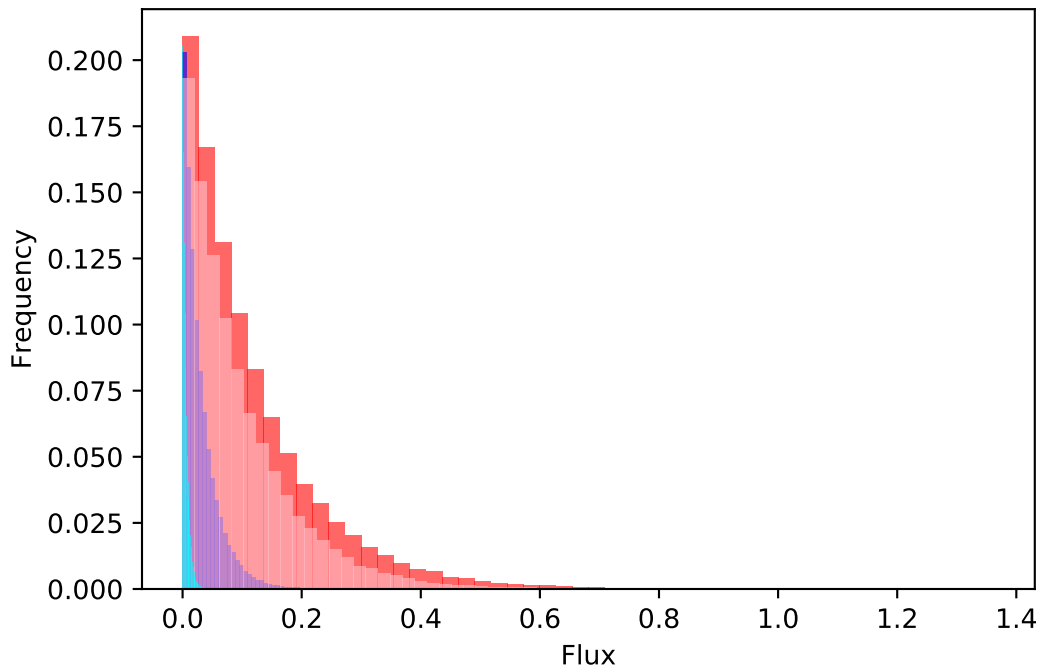528 : Tyr_m -->
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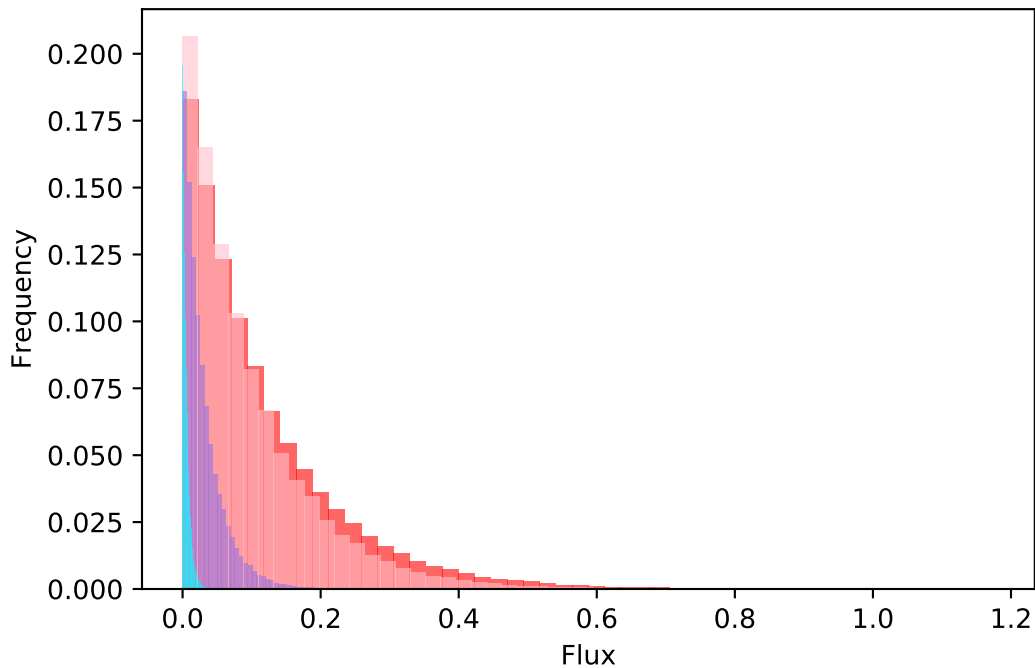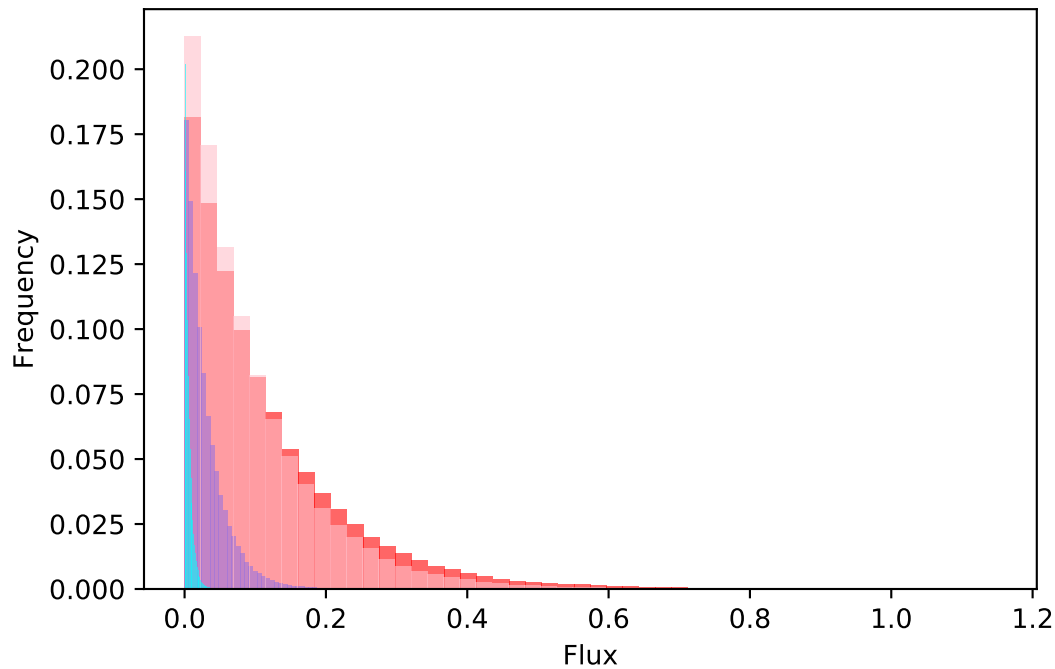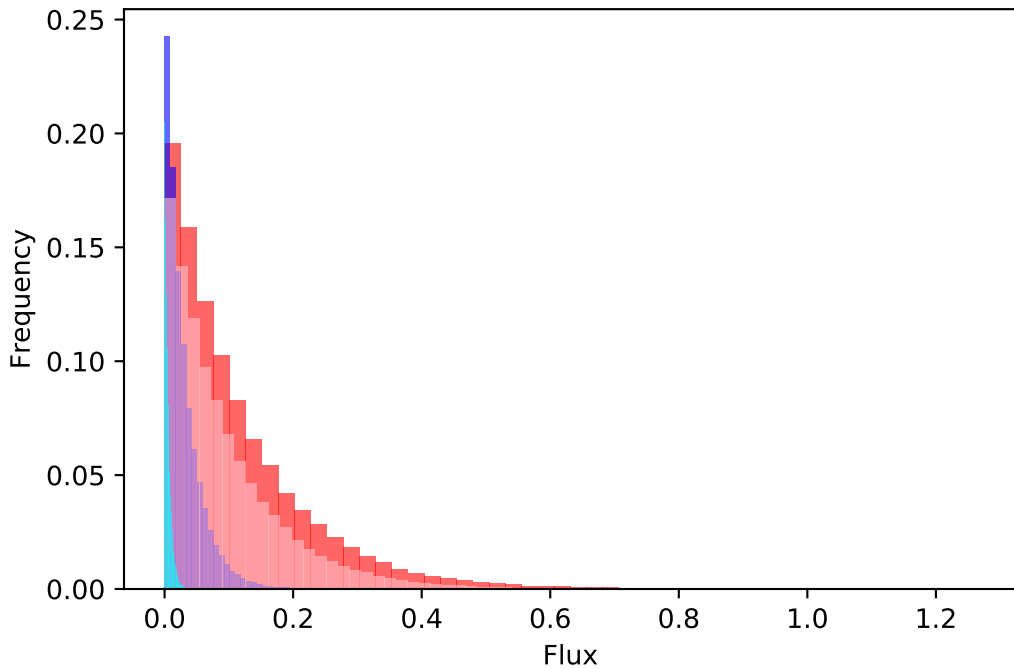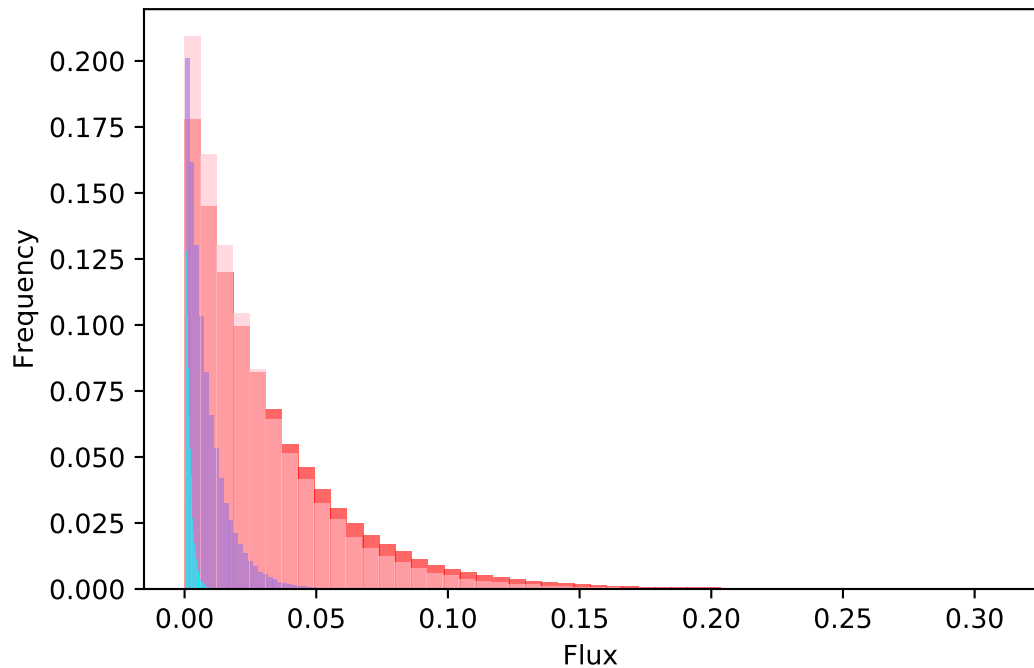
529 : Tyr_p -->
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530 : Val_c -->
['-']

531 : Val_h -->
['-']

532 : Val_m -->
['-']
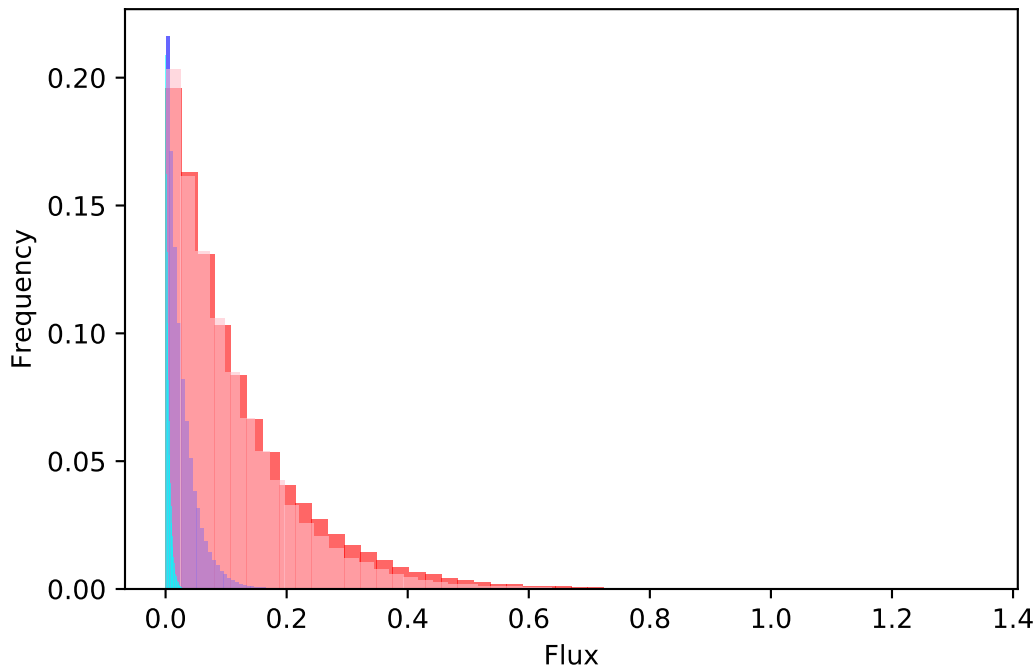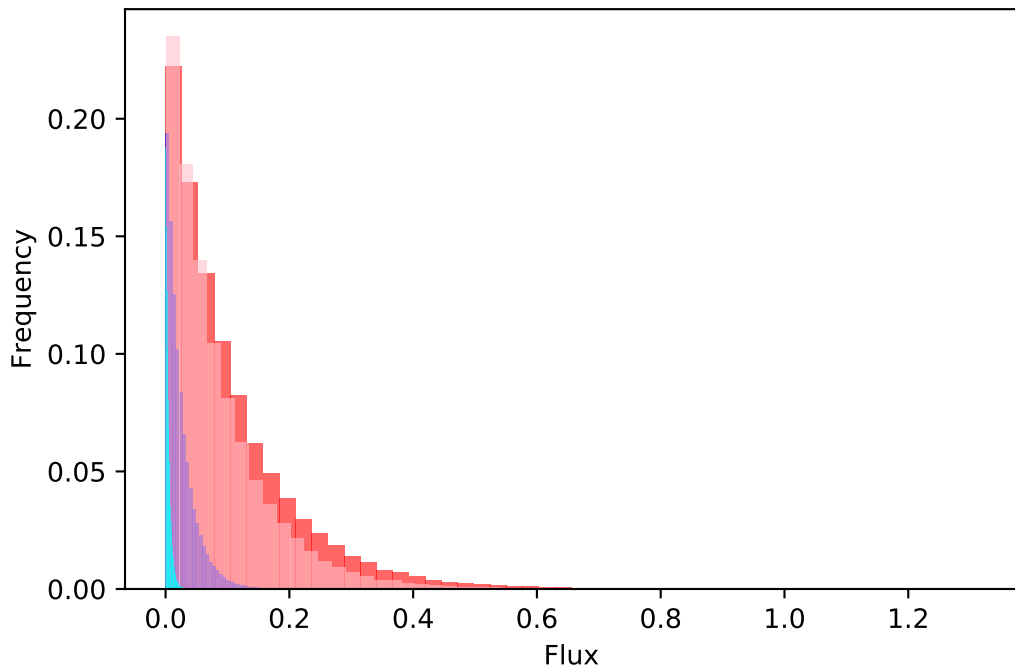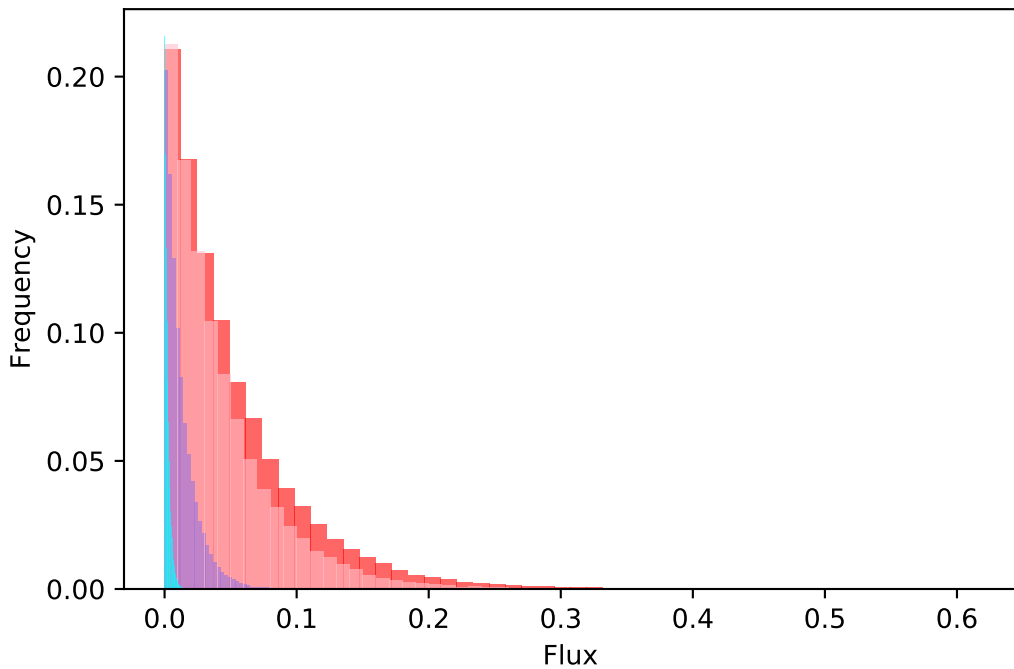
533 : Val_p -->
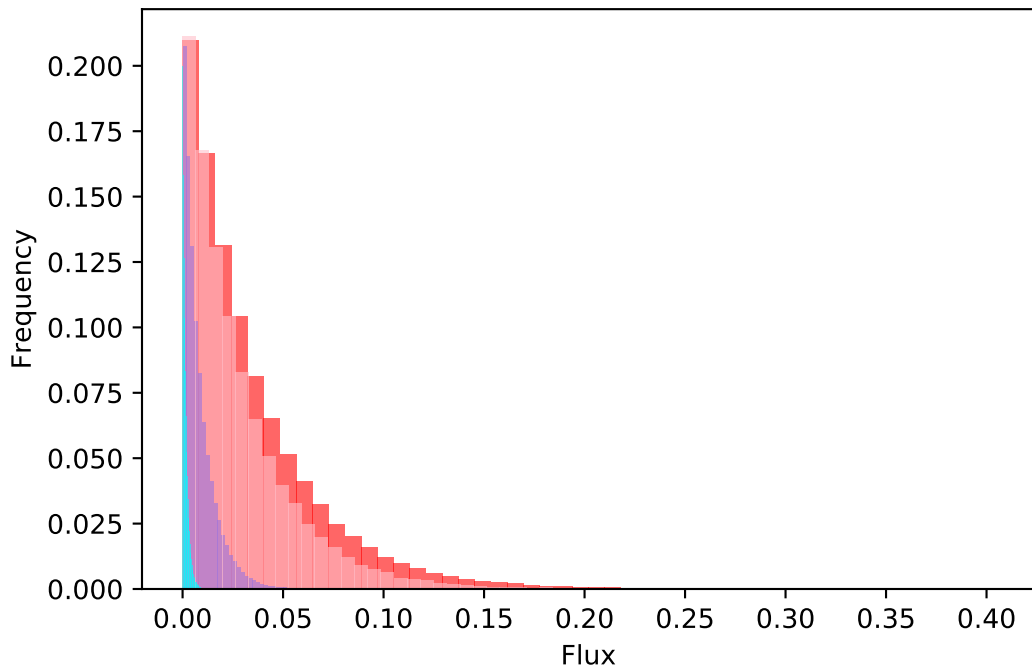['-']

534 : starch3_h -->
['-']

535 : Glc_c -->
['-']

536 : Frc_c -->
['-']
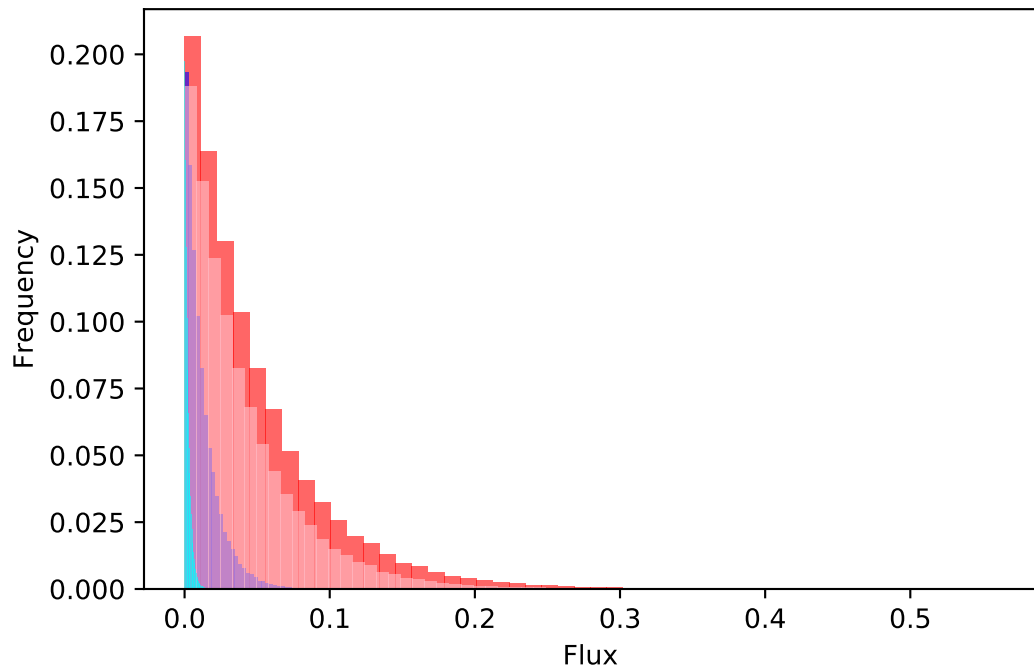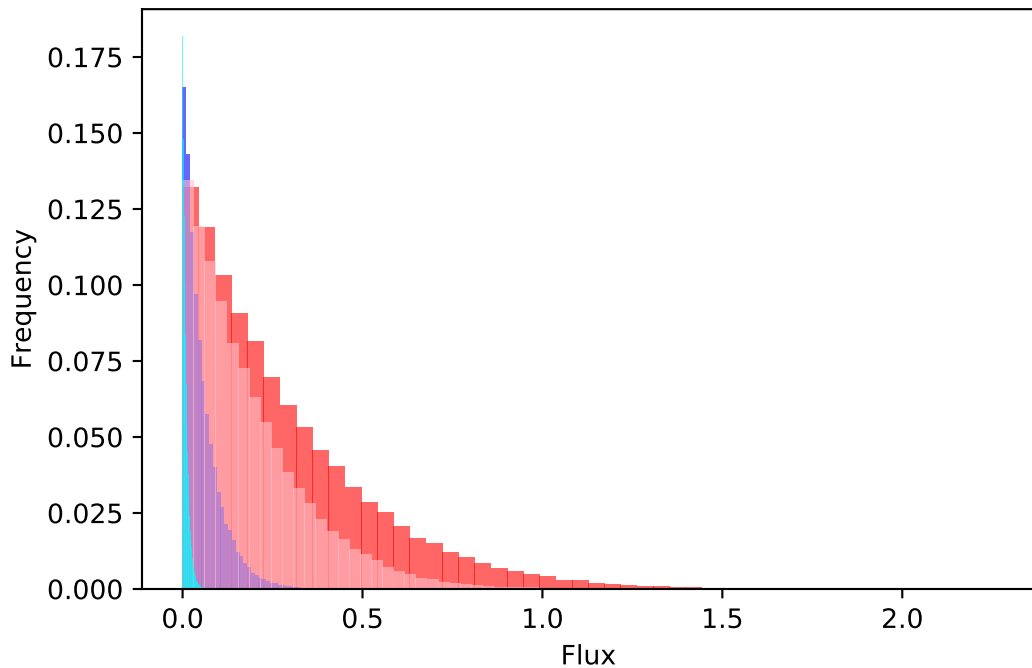
537 : Suc_c -->
['-']

538 : cellulose3_c -->
['-']

539 : Mas_c -->
['-']

540 : M_DASH_ACP_h --> ACP_h + H_h
['-']

541 : Tre_c -->
['-']

542 : ATP_c + H2O_c --> ADP_c + H_c + Pi_c
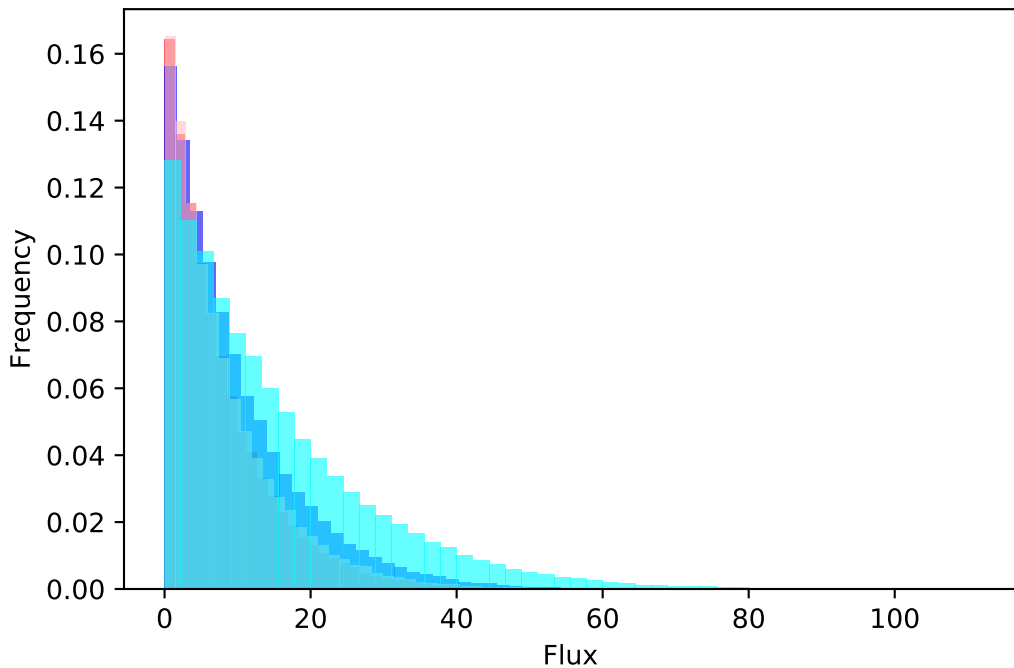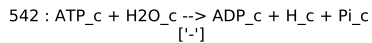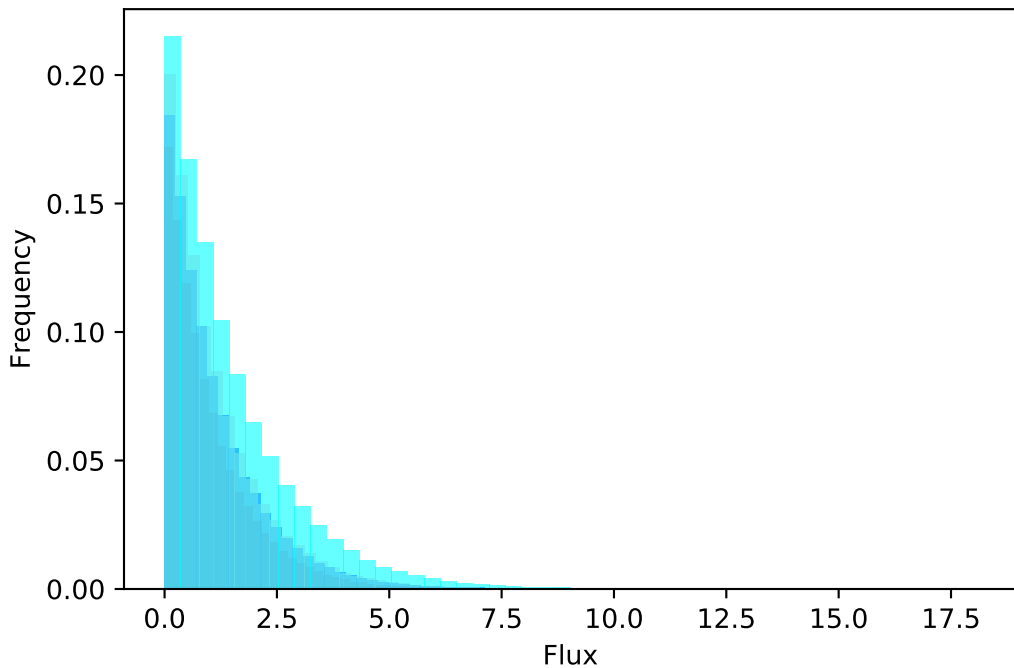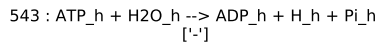['-']

543 : ATP_h + H2O_h --> ADP_h + H_h + Pi_h
['-']

544 : ATP_m + H2O_m --> ADP_m + H_m + Pi_m
['-']

Arg_c + Asn_c + Asp_c + Cys_c + Gln_c + Glu_c + Gly_c + His_c + Ile_c + Leu_c + Lys_c + Met_c + Phe_c + Pro_c + Ser_c + Thr_c + Trp_c + T
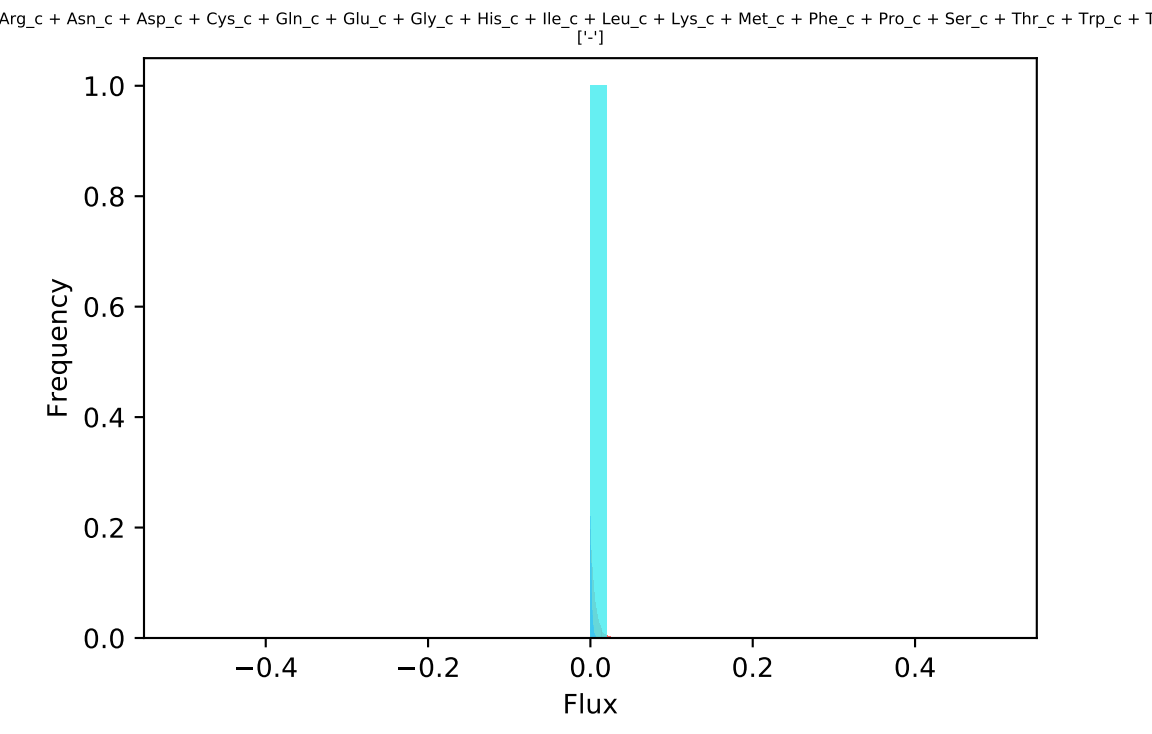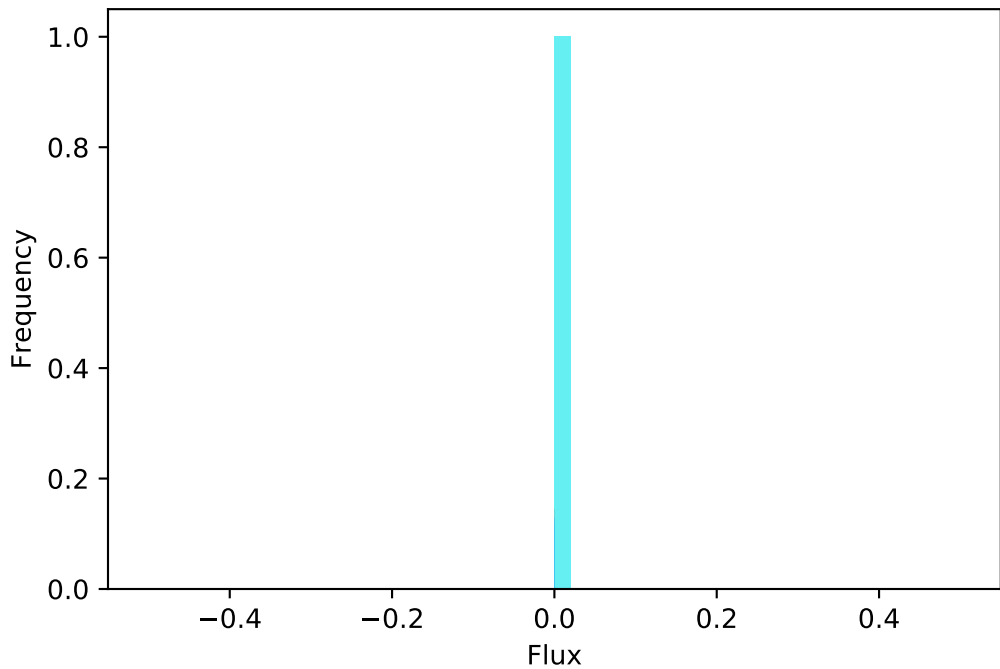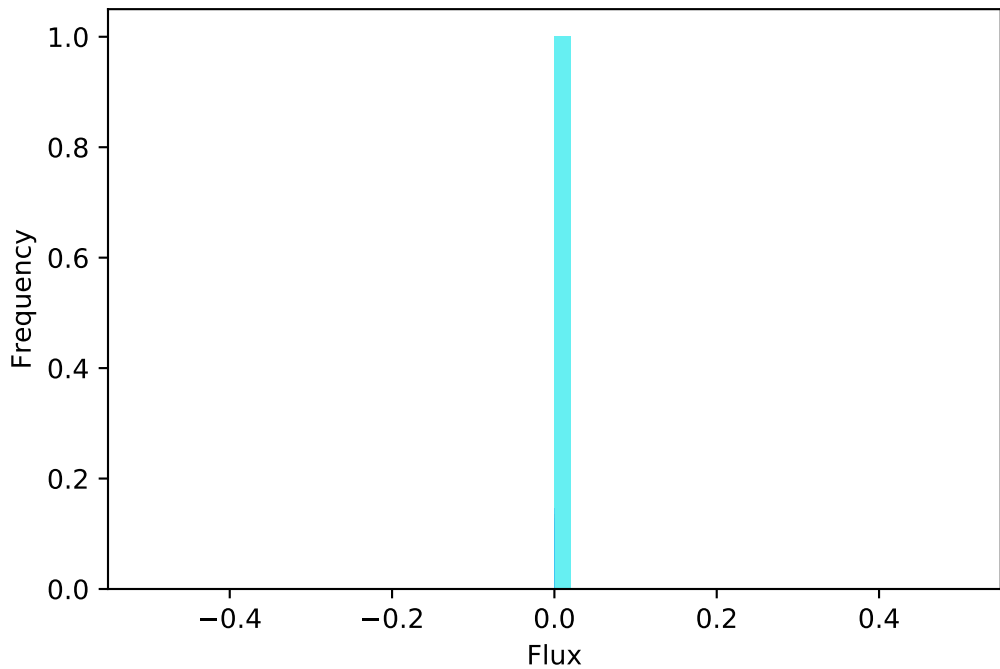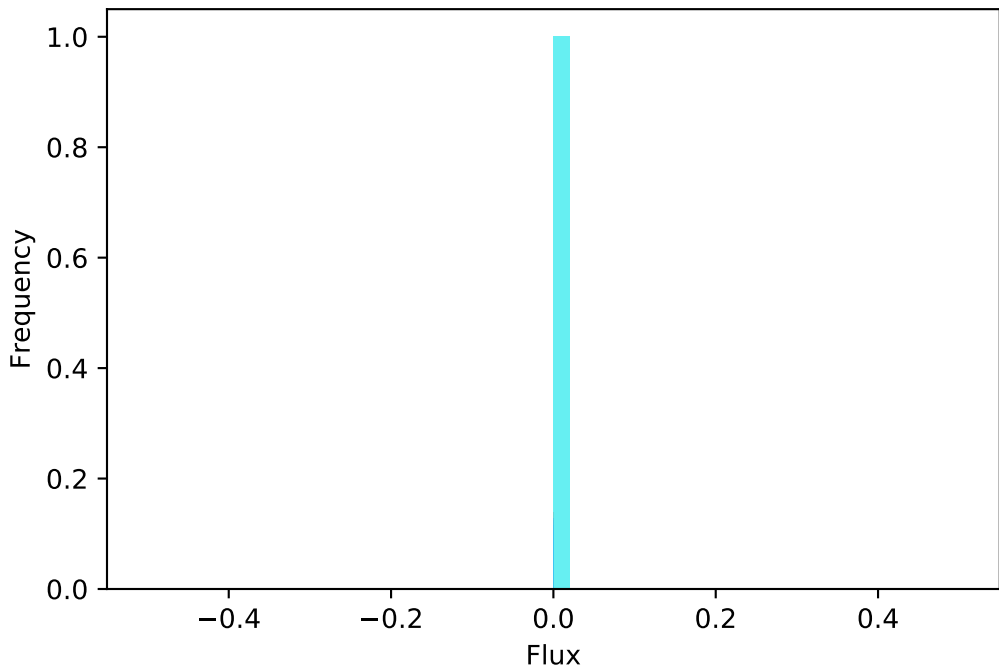['-']
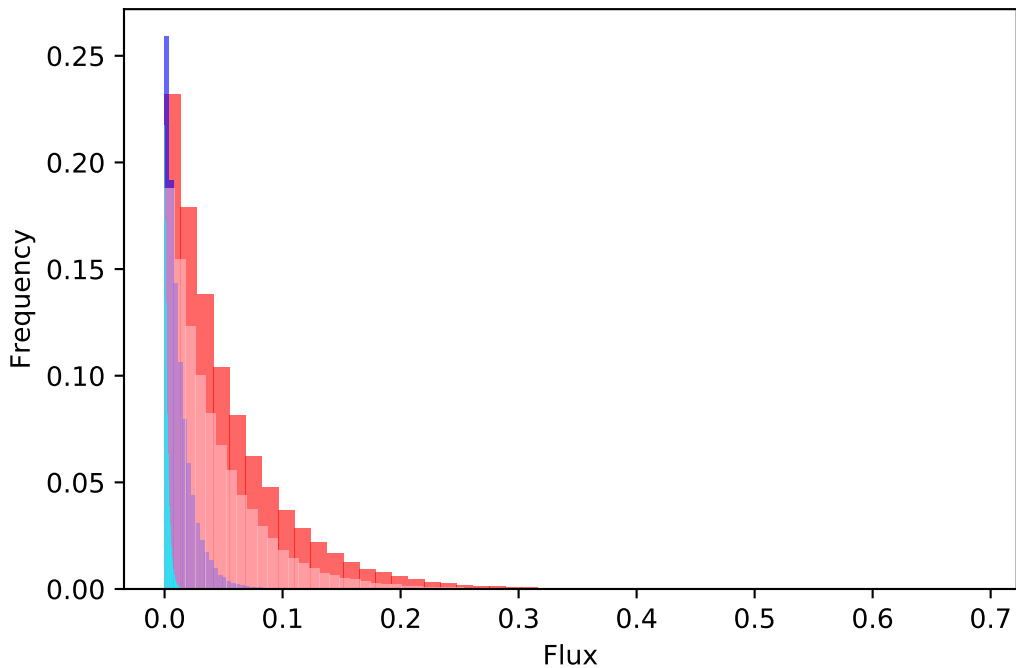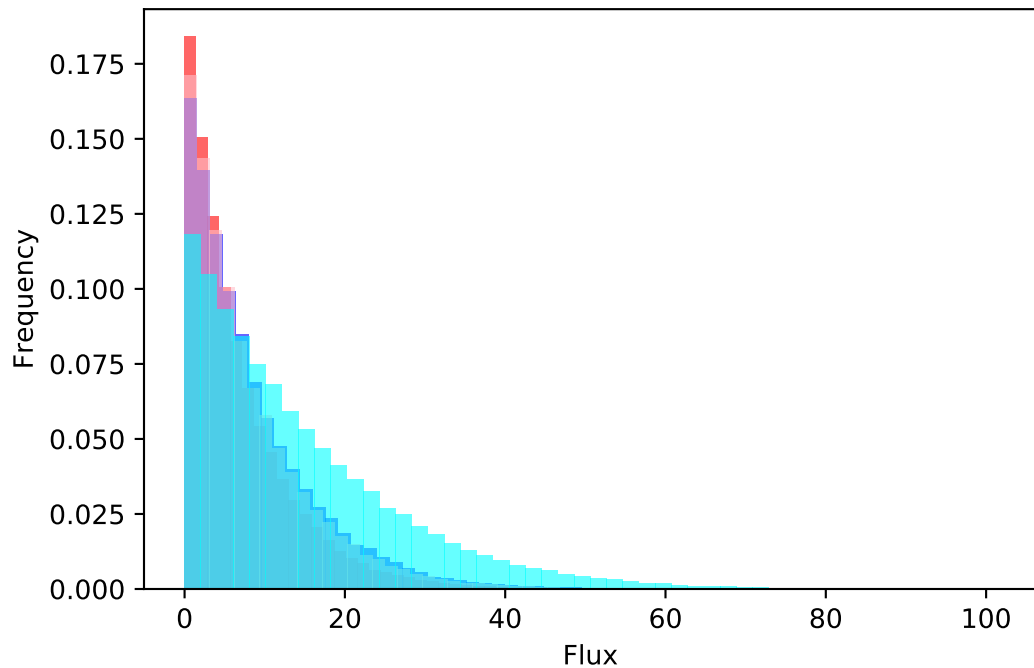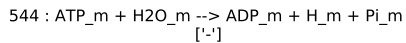
779.97036 M_DASH_ACP_h + 38.11199 Mal_m + 2.27742 Mas_c + 30.37981 Met_c + 14.60727 Orn_h + 59.65081 Phe_c + 96.88322 Pro_c + 0

['-']

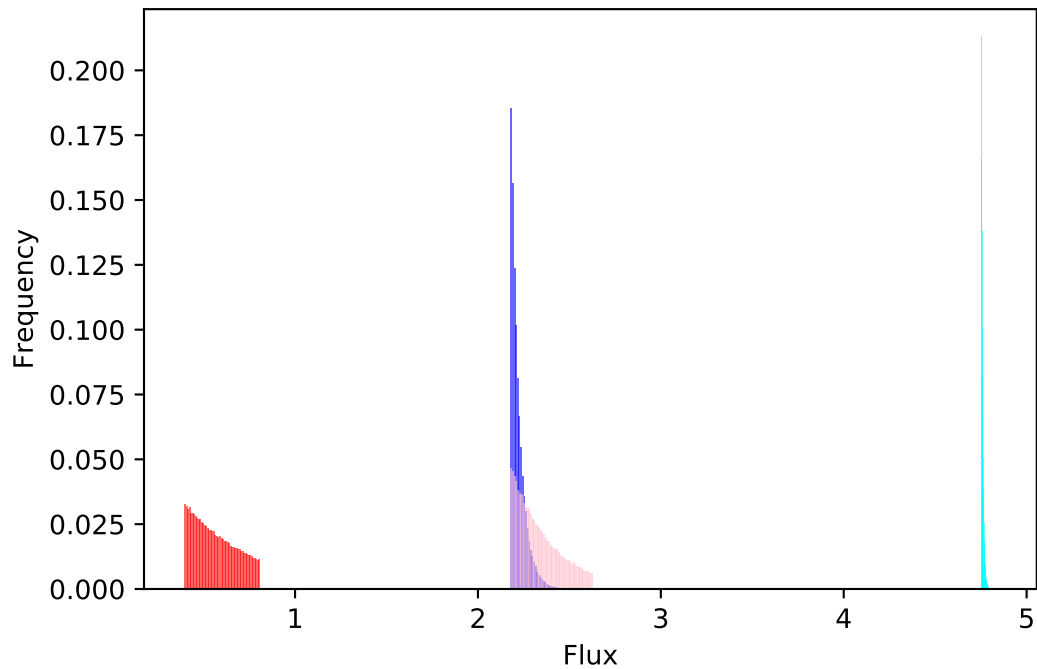_c + 826.95653 M_DASH_ACP_h + 10.89856 Mal_m + 5.37965 Mas_c + 51.81818 Met_c + 9.64682 Orn_h + 101.65645 Phe_c + 164.00331 Pro_
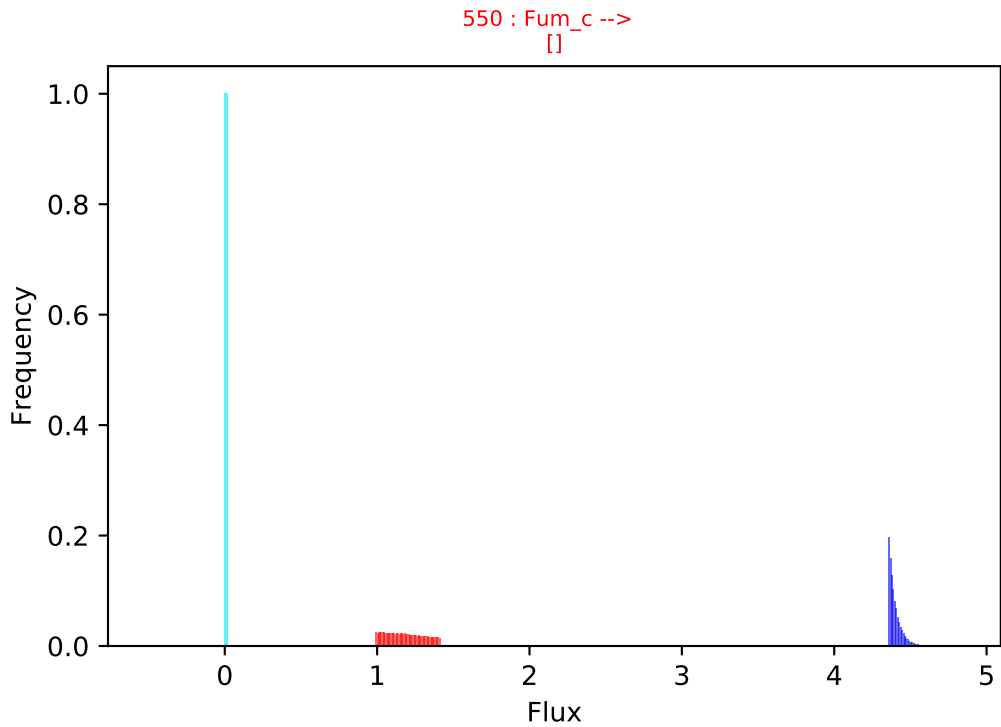['-']

779.97036 M_DASH_ACP_h + 50.99641 Mal_m + 2.60958 Mas_c + 33.61497 Met_c + 1.58654 Orn_h + 66.66173 Phe_c + 108.03688 Pro_c + 0
['-']

549 : Mal_c -->
[]

550 : Fum_c -->
[]

551 : starch1_h -->
[]