Distributed Signatures: A Policy Switching Approach to the Coordination of Protection Schemes

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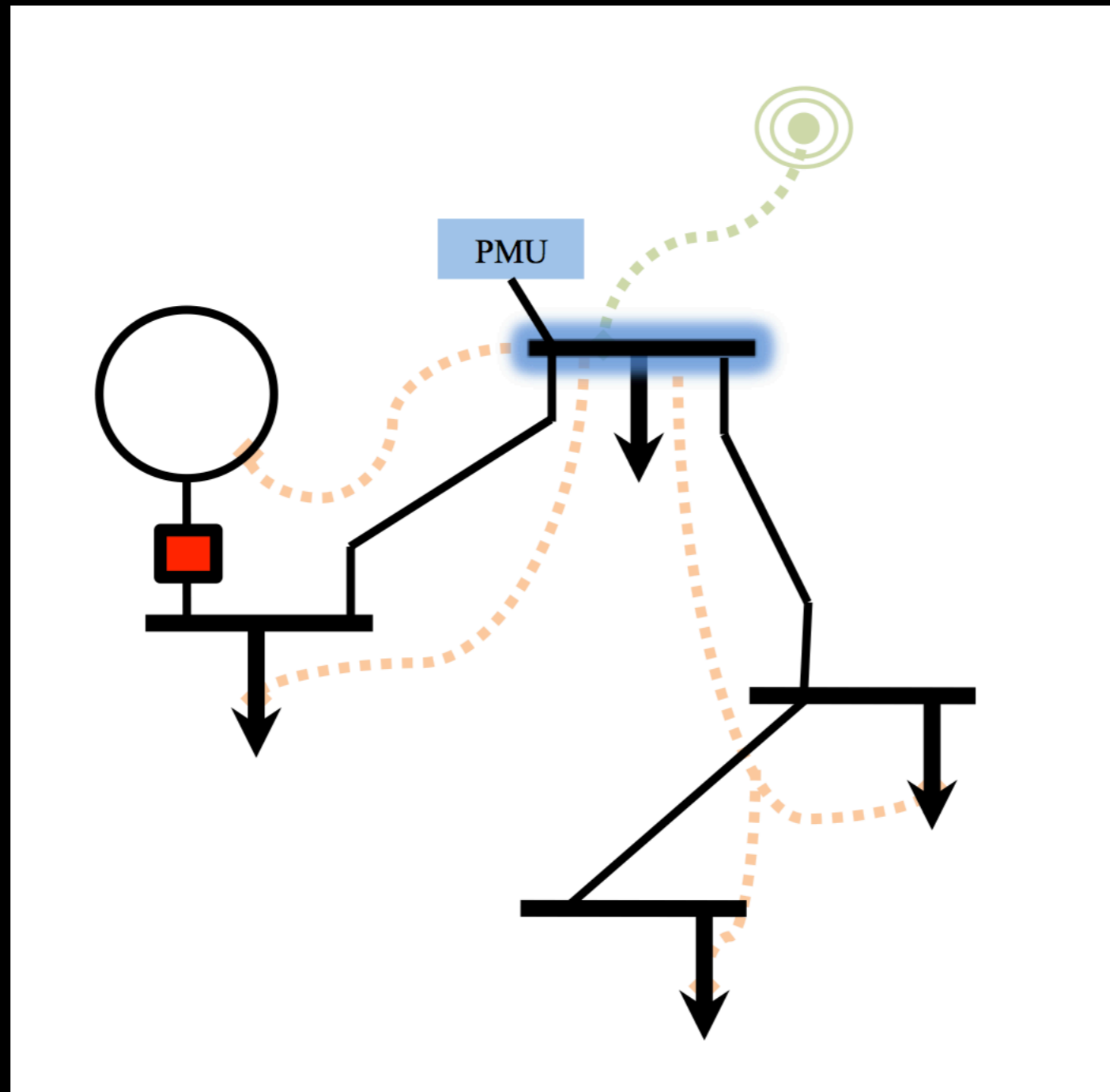Department of Electrical
& Computer Engineering

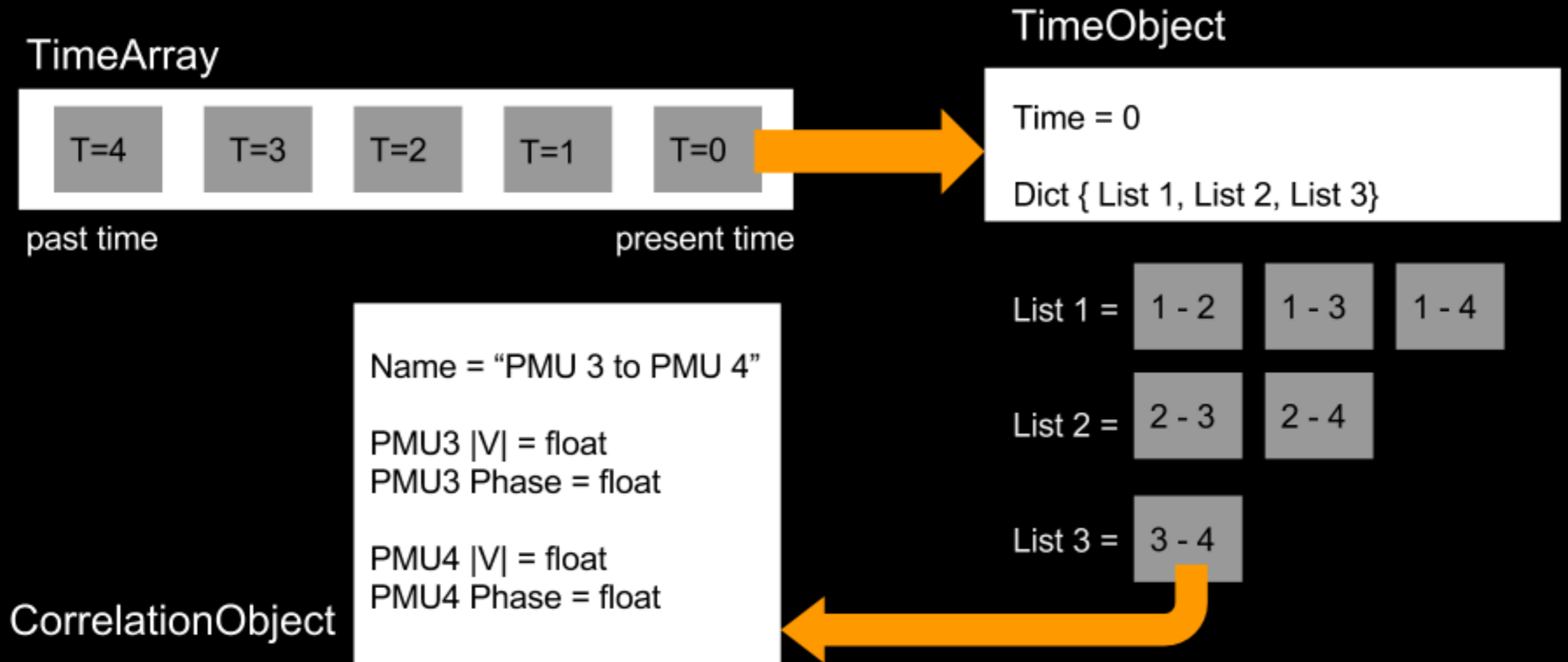Portland State University

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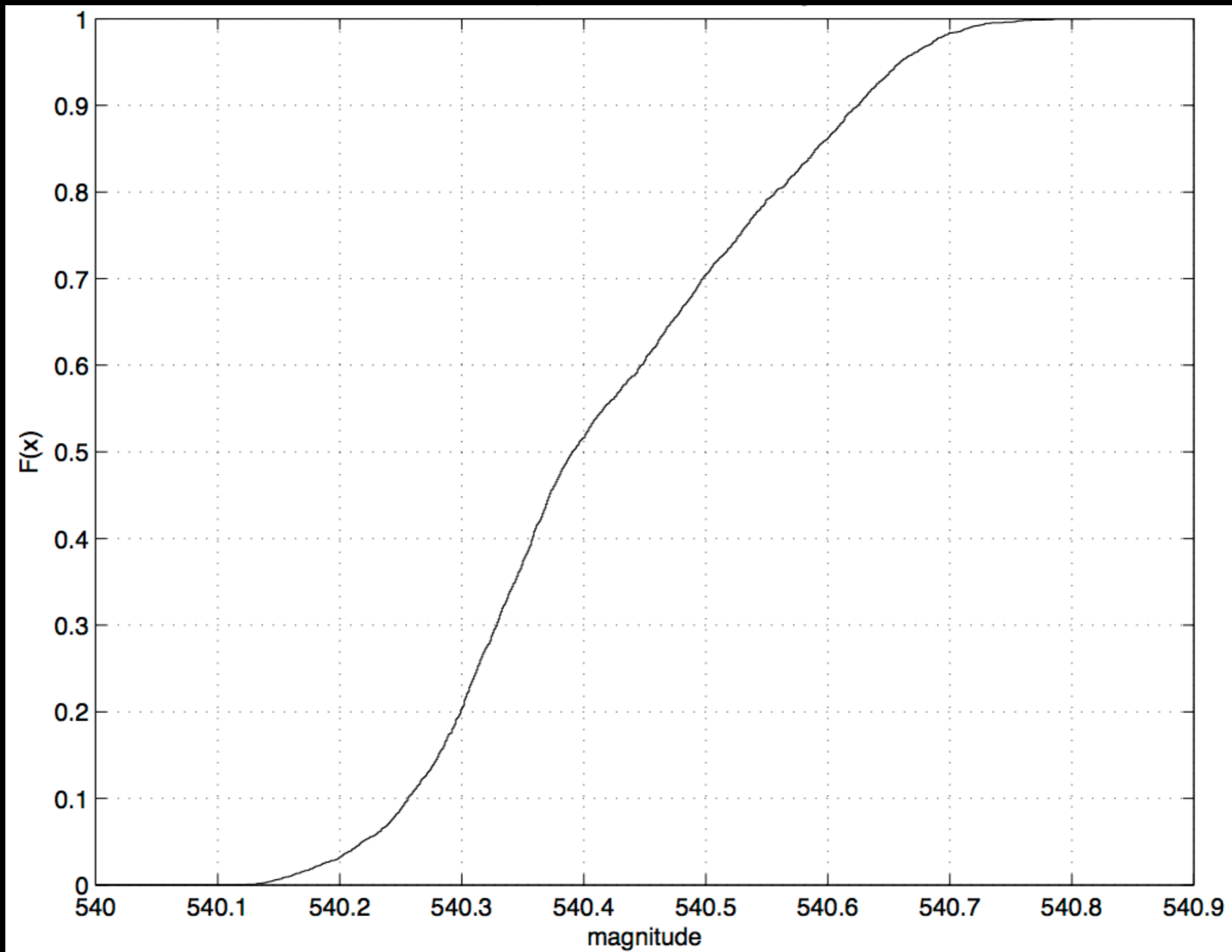Computer Science

Washington State
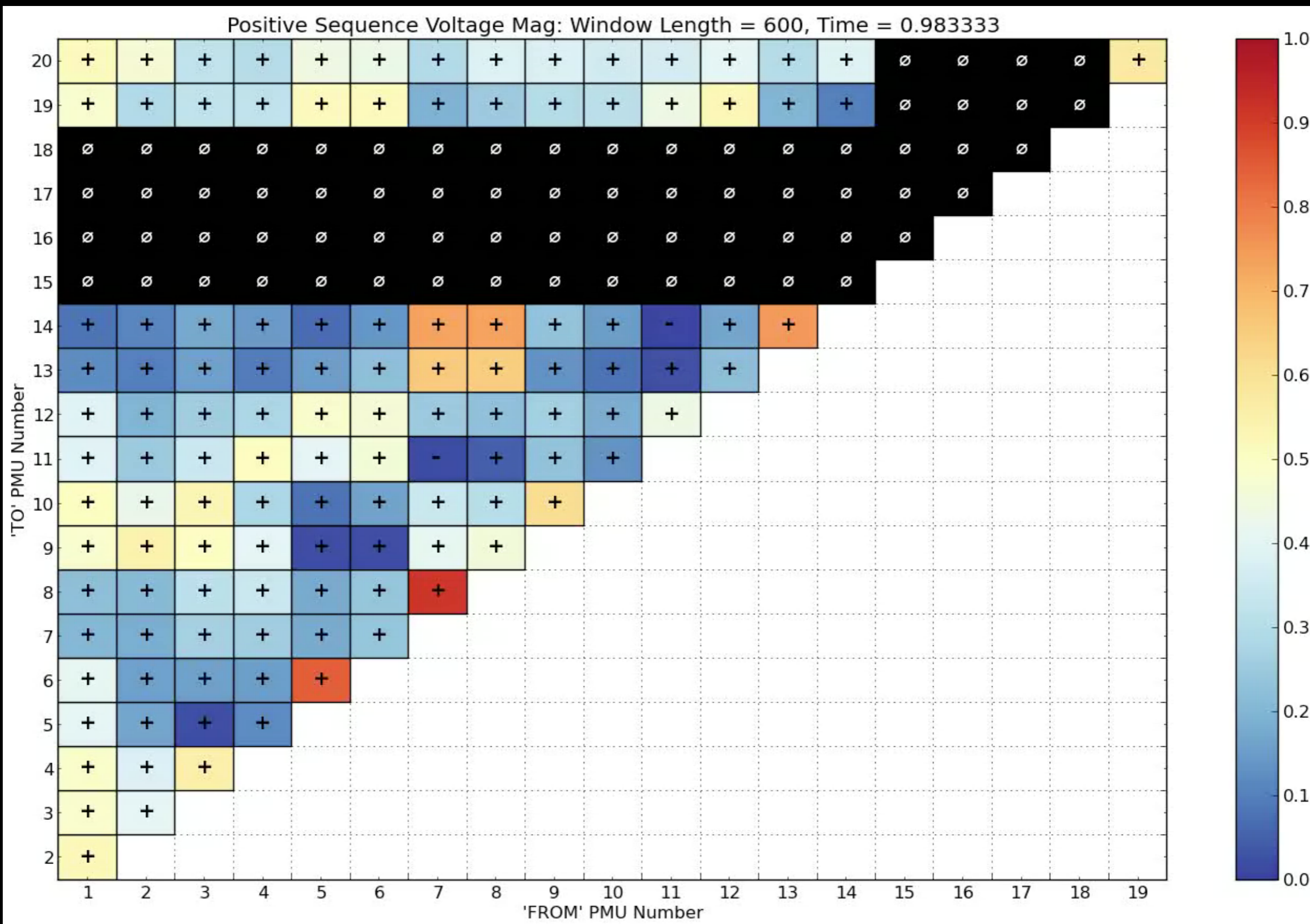University, Vancouver

Islanding Signatures

Signature Analysis

Signature Analysis
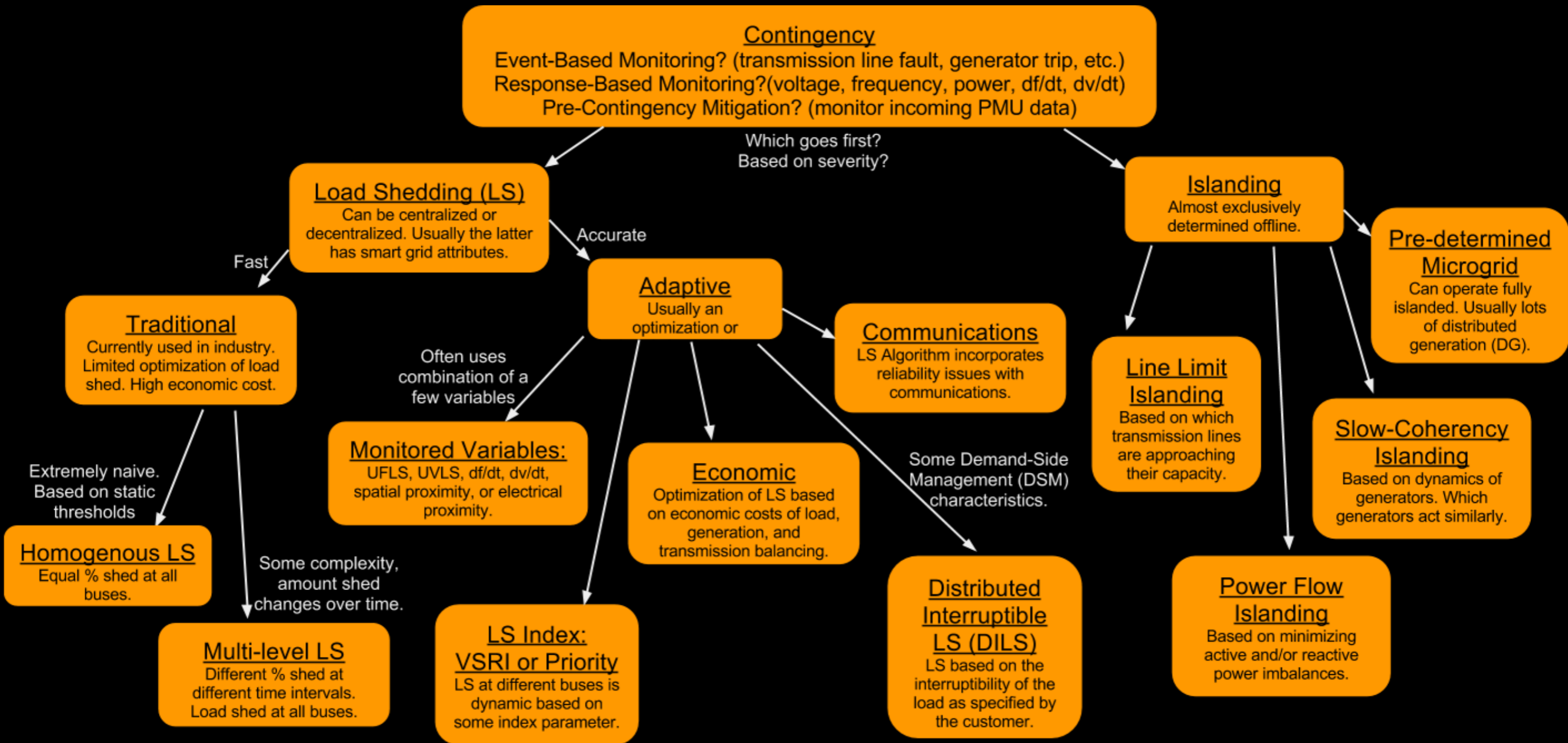

Positive Sequence Voltage Mag: Window Length = 600, Time = 0.983333

Policy Switching

Policy Switching

FULL ENUMERATION OF THE EXAMPLE N-2 CONTINGENCY – LINE 19 TO 20 AND LINE 2 TO 25

Policy Available (Π):	Islanding (I)	Load Shedding (LS)	Islanding and Load Shedding					
FIRST POLICY	I	LS	I	I	I	LS	LS	LS
Operational Load (L) [MVA]	4759	5224	4759	4759	4759	5224	5224	5224
System Saved (B)	NO	NO	NO	NO	NO	NO	NO	NO
Reward† (V^π)	0.366	0.401	0.366	0.366	0.366	0.401	0.401	0.401
# Buses Lost	7	3	7	7	7	3	3	3
# Generators Lost	2	2	2	2	2	2	2	2
# Full Loads Lost	4	1	4	4	4	1	1	1
# Transmission Lines Lost	13	6	13	13	13	6	6	6
SECOND POLICY	I	LS	I	LS	LS	LS	I	I
Operational Load (L) [MVA]	3848	2922	3848	4283	4283	2922	4749	4749
System Saved (B)	NO	YES	NO	YES	YES	YES	YES	YES
Reward† (V^π)	0.296	0.725	0.296	0.829	0.829	0.725	0.865	0.865
# Buses Lost	14	21	14	7	7	21	5	5
# Generators Lost	3	5	3	2	2	5	2	2
# Full Loads Lost	8	9	8	4	4	9	3	3
# Transmission Lines Lost	21	27	21	13	13	27	9	9
THIRD POLICY	I*	LS**	LS	I**	LS**	I**	LS**	I**
Operational Load (L) [MVA]	-	-	3463	-	-	-	-	-
System Saved (B)	-	-	YES	-	-	-	-	-
Reward† (V^π)	-	-	0.766	-	-	-	-	-
# Buses Lost	-	-	14	-	-	-	-	-
# Generators Lost	-	-	3	-	-	-	-	-
# Full Loads Lost	-	-	8	-	-	-	-	-
# Transmission Lines Lost	-	-	21	-	-	-	-	-

† Reward calculated based on $L_{total} = 6501$ [MVA]

*No third islanding policy available – Case too small

**Not needed – In-service buses within acceptable operating range

Thank you!
Discussion, comments