Material Suplementar - Inferência de Redes de Regulação Gênica a partir de Séries Temporais via Meta-heurísticas

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Análise comparativa entre o uso e o não uso do pré-processamento com *spline* para todos os métodos de discretização. *Boxplots* vazios significam inexistência de solução factível pela CGP para a configuração.

- ast - 099OT **TOP55** OSGOT TOP45 TOP40 **TOP35** TOP30 TOP25 VSC - AUPRC - Spline MEDIAN -NA3M - 09XAM 42XAM 02XAM KMEANS_MATRIX KMEANS_ROW -- פאררס EMD ELD -BIKWEANS-0.9 0.8 0.7 9.0 0.4 0.5 0.3 **DA9UA**

Figura 1: Resultados para o problema VSC com Spline, considerando AUPRC.

ΔST - 099OT **TOP55** OSGOT -TOP45 ---TOP40 H TOP35 TOP30 TOP25 VSC - AUPRC - No Spline MEDIAN -NA3M - 09XAM 42XAM 02XAM KMEANS_MATRIX KMEANS_ROW GALLO EMD ELD -BIKWEANS-0.9 0.8 0.7 0.6 ЭЯЧUА .S. 0.4 0.3 0.1 0.0

Figura 2: Resultados para o problema VSC sem Spline, considerando AUPRC.

TSD - 099OT TOP55 TOP50 TOP45 TOP40 **TOP35** TOP30 VSC - 0% dropout - AUPRC TOP25 Smoothing Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM KMEAUS_MATRIX KMEANS_ROW - GALLO EMD -ELD BIKWEYNZ 0.6 0.9 0.8 0.7 ЭЯЧUА .S. 0.4 0.3 0.2 0.1 0.0

Figura 3: Resultados para o problema VSC com e sem Spline, considerando AUPRC e 0% dropout.

TSD - 099OT **TOP55** TOP50 TOP45 TOP40 **TOP35** TOP30 VSC - 50% dropout - AUPRC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM KMEAUS_MATRIX KMEANS_ROW GALLO EMD EŁD BIKWEYNZ 0.6 ЭЯЧUА г.́ 0.9 0.8 0.7 0.4 0.3 0.2 0.1 0.0

Figura 4: Resultados para o problema VSC com e sem Spline, considerando AUPRC e 50% dropout.

TSD - 094ОТ TOP55 TOP50 TOP45 TOP40 **TOP35** TOP30 VSC - 70% dropout - AUPRC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM $KMEAUS_MATRIX$ KMEANS_ROW GALLO EMD -ELD BIKWEYNZ ЭЯЧUА г.́ 0.9 0.8 0.7 0.6 0.4 0.3 0.1 0.0

Figura 5: Resultados para o problema VSC com e sem Spline, considerando AUPRC e 70% dropout.

ΔST **10P60 TOP55** TOP50 TOP45 TOP40 TOP35 TOP30 TOP25 %0Z mCAD - AUPRC - Spline MEDIAN -NAAM 09XAM 42XAM 02XAM KMEANS_MATRIX KMEANS_ROW OTTAD EMD EED. BIKWEPN2 0.8 0.7 0.6 ЭЯЧUА .S. 0.4 0.3 0.2 0.1 0.0

Figura 6: Resultados para o problema mCAD com Spline, considerando AUPRC.

ΔST 094OT **TOP55** OSGOT TOP45 TOP40 TOP35 TOP30 mCAD - AUPRC - No Spline TOP25 %0Z Dropout Rate MEDIAN -- NA3M 09XAM 42XAM 02XAM KMEANS_MATRIX KMEANS_ROW -OTTAD EMD ELD: BIKWEPN2 0.9 0.8 0.7 0.6 ЭЯЧUА .S. 0.4 0.3 0.2 0.1 0.0

Figura 7: Resultados para o problema m
CAD sem Spline, considerando AUPRC.

TSD - 099OT TOP55 TOP50 TOP45 TOP40 **TOP35** TOP30 mCAD - 0% dropout - AUPRC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM KMEAUS_MATRIX KMEANS_ROW GALLO EMD ELD BIKWEYNZ - 9.0 0.9 0.8 0.7 ЭЯЧUА .S. 0.4 0.3 0.2 0.1 0.0

Figura 8: Resultados para o problema m
CAD com e sem Spline, considerando AUPRC e 0% dropout.

TSD - 099OT **TOP55** TOP50 TOP45 TOP40 **TOP35** TOP30 mCAD - 50% dropout - AUPRC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM KMEAUS_MATRIX KMEANS_ROW GALLO EMD EŁD BIKWEYNZ - 9.0 AUPRC ... 0.9 0.8 0.7 0.4 0.3 0.2 0.1 0.0

Figura 9: Resultados para o problema mCAD com e sem Spline, considerando AUPRC e 50% dropout.

TSD - 099OT **TOP55** TOP50 TOP45 TOP40 **TOP35** TOP30 mCAD - 70% dropout - AUPRC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM KMEAUS_MATRIX KMEANS_ROW GALLO EMD EŁD BIKWEYNZ - 9.0 ЭЯЧUА г.́ 0.9 0.8 0.7 0.4 0.3 0.2 0.1 0.0

Figura 10: Resultados para o problema m
CAD com e sem Spline, considerando AUPRC e 70% dropout.

- ast - 099OT **TOP55** OSAOT TOP45 TOP40 TOP35 TOP30 TOP25 HSC - AUPRC - Spline MEDIAN -- NA3M - 09XAM ₽2XAM 02XAM KMEANS_MATRIX KMEANS_ROW -- פאררס EMD ELD -BIKWEANS -0.4 0.9 0.8 0.7 9.0 0.5 0.1 **DA9UA**

Figura 11: Resultados para o problema HSC com Spline, considerando AUPRC.

ΔST 094OT **TOP55** OSAOT TOP45 TOP40 TOP35 TOP30 TOP25 HSC - AUPRC - No Spline MEDIAN - MEAM 09XAM 42XAM 02XAM KMEANS_MATRIX KMEANS_ROW OTTAD EMD ELD: BIKWEPN2 0.9 0.8 0.7 0.6 ЭЯЧUА .S. 0.4 0.3 0.1 0.0

Figura 12: Resultados para o problema HSC sem Spline, considerando AUPRC.

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TSD - 099OT TOP55 TOP50 TOP45 TOP40 H**TOP35** TOP30 HSC - 0% dropout - AUPRC TOP25 Smoothing Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM $KMEAUS_MATRIX$ KMEANS_ROW GALLO EMD EŁD BIKWEYNZ - 9.0 ЭЯЧUА г.́ 0.3 1.0 0.9 0.8 0.7 0.4 0.2 0.1 0.0

Figura 13: Resultados para o problema HSC com e sem Spline, considerando AUPRC e 0% dropout.

TSD - 099OT **TOP55** TOP50 TOP45 TOP40 **TOP35** TOP30 HSC - 50% dropout - AUPRC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM $KMEAUS_MATRIX$ KMEANS_ROW - GALLO EMD ELD BIKWEYNZ - 9.0 ЭЯЧUА г.́ 0.9 0.8 0.7 0.4 0.3 0.2 0.1 0.0

Figura 14: Resultados para o problema HSC com e sem Spline, considerando AUPRC e 50% dropout.

TSD - 099OT TOP55 TOP50 TOP45 TOP40 **TOP35** TOP30 HSC - 70% dropout - AUPRC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM $KMEAUS_MATRIX$ KMEANS_ROW GALLO EMD -ELD BIKWEYNZ ЭЯЧUА г.́ 0.9 0.8 0.7 0.6 0.4 0.3 0.2 0.1 0.0

Figura 15: Resultados para o problema HSC com e sem Spline, considerando AUPRC e 70% dropout.

ΔST **10P60 TOP55** TOP50 TOP45 TOP40 TOP35 TOP30 TOP25 VSC - AUROC - Spline MEDIAN - MEAM 09XAM 42XAM 02XAM KMEANS_MATRIX KMEANS_ROW -OTTAD EMD EED. BIKWEPN2 0.9 0.8 0.7 0.6 OSUA O. N. 0.4 0.3 0.2 0.1 0.0

Figura 16: Resultados para o problema VSC com Spline, considerando AUROC.

ΔST 094OT **TOP55** TOP50 TOP45 TOP40 TOP35 TOP30 TOP25 VSC - AUROC - No Spline MEDIAN -NA3M 09XAM 42XAM 02XAM KMEANS_MATRIX KMEANS_ROW -OTTA9 EMD EED -BIKWEANS-OSUA Ö. Ö. 0.9 0.8 0.7 0.6 0.4 0.3 0.2 0.1 0.0

Figura 17: Resultados para o problema VSC sem Spline, considerando AUROC.

TSD - 099OT TOP55 TOP50 TOP45 TOP40 **TOP35** TOP30 VSC - 0% dropout - AUROC TOP25 Smoothing Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM $KMEAUS_MATRIX$ KMEANS_ROW GALLO EMD EŁD BIKWEYNZ ЭОЯUА г.́ 0.4 1.0 0.9 0.8 0.7 0.6 0.3 0.2 0.1 0.0

Figura 18: Resultados para o problema VSC com e sem Spline, considerando AUROC e 0% dropout.

TSD - 099OT **TOP55** TOP50 TOP45 TOP40 **TOP35** TOP30 VSC - 50% dropout - AUROC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM $KMEAUS_MATRIX$ KMEANS_ROW GALLO EMD EŁD BIKWEYNZ ЭОЯUА г.́ 0.4 0.9 0.8 0.7 0.6 0.3 0.2 0.1 0.0

Figura 19: Resultados para o problema VSC com e sem Spline, considerando AUROC e 50% dropout.

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TSD - 099OT **TOP55** TOP50 TOP45 TOP40 **TOP35** TOP30 VSC - 70% dropout - AUROC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM $KMEAUS_MATRIX$ KMEANS_ROW GALLO EMD EŁD BIKWEYNZ 0.6 ЭОЯUА г.́ 0.4 0.9 0.8 0.7 0.3 0.2 0.1 0.0

Figura 20: Resultados para o problema VSC com e sem Spline, considerando AUROC e 70% dropout.

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ΔST 0940T **TOP55** TOP50 TOP45 TOP40 TOP35 TOP30 TOP25 mCAD - AUROC - Spline MEDIAN MEAM 09XAM 42XAM 02XAM 0 0 KMEANS_MATRIX KMEANS_ROW OTT49 EMD ELD BIKWEYNZ ЭОЯUА г.́ 0.9 0.8 0.7 0.6 0.4 0.3 0.2 0.1 0.0

Figura 21: Resultados para o problema mCAD com Spline, considerando AUROC.

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ΔST 0940T **TOP55** TOP50 TOP45 TOP40 TOP35 TOP30 mCAD - AUROC - No Spline TOP25 MEDIAN MEAM 09XAM 42XAM 02XAM KMEANS_MATRIX KMEANS_ROW OTT49 EMD ELD BIKWEYNZ ЭОЯUА г.́ 1.0 0.9 0.8 0.7 0.6 0.4 0.3 0.2 0.1 0.0

Figura 22: Resultados para o problema m
CAD sem Spline, considerando AUROC.

TSD 094OT **TOP55** 029OT TOP45 TOP40 **TOP35** TOP30 mCAD - 0% dropout - AUROC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM 0 0 KMEAUS_MATRIX KMEANS_ROW GALLO EMD EŁD BIKWEYNZ 0.4 ЭОЯUА г.́ 0.3 1.0 0.9 0.8 0.7 0.6 0.2 0.1 0.0

Figura 23: Resultados para o problema mCAD com e sem Spline, considerando AUROC e 0% dropout.

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TSD - 099OT **TOP55** 029OT TOP45 TOP40 **TOP35** 0E9OT mCAD - 50% dropout - AUROC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM KMEAUS_MATRIX KMEANS_ROW GALLO EMD EŁD BIKWEYNZ 0.6 ЭОЯUА г.́ 0.4 0.2 1.0 0.9 0.8 0.7 0.3 0.1 0.0

Figura 24: Resultados para o problema m
CAD com e sem Spline, considerando AUROC e 50% dropout.

TSD 094OT **TOP55** 029OT TOP45 TOP40 **TOP35** TOP30 mCAD - 70% dropout - AUROC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM KMEAUS_MATRIX KMEANS_ROW GALLO EMD EŁD BIKWEYNZ - 6.0 ЭОЯUА г.́ 0.4 1.0 0.8 0.7 0.6 0.3 0.2 0.1 0.0

Figura 25: Resultados para o problema m
CAD com e sem Spline, considerando AUROC e 70% dropout.

ΔST 094OT **TOP55** OSAOT TOP45 - 0440T TOP35 TOP30 TOP25 HSC - AUROC - Spline MEDIAN -NA3M 09XAM 42XAM OZXAM KMEANS_MATRIX KMEANS_ROW -OTTAD EMD ELD -BIKWEPNS -0.9 0.8 0.7 0.6 0.5 9.4 0.3 0.2 0.1 0.0 OSUA

Figura 26: Resultados para o problema HSC com Spline, considerando AUROC.

ΔST 094OT **TOP55** OSAOT TOP45 - 0440T TOP35 TOP30 TOP25 HSC - AUROC - No Spline MEDIAN -NA3M 09XAM 42XAM 02XAM KMEANS_MATRIX KMEANS_ROW OTTAD EMD EED -BIKWEPNS -0.9 0.8 0.7 0.6 OSUA O. N. 0.4 0.3 0.2 0.1 0.0

Figura 27: Resultados para o problema HSC sem Spline, considerando AUROC.

TSD - 099OT TOP55 TOP50 TOP45 TOP40 **TOP35** TOP30 TOP25 HSC - 0% dropout - AUROC Smoothing Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM $KMEAUS_MATRIX$ KMEANS_ROW GALLO EMD ELD BIKWEYNZ ЭОЯUА г.́ 0.9 0.8 0.7 0.6 0.4 0.3 0.2 0.1 0.0

Figura 28: Resultados para o problema HSC com e sem Spline, considerando AUROC e 0% dropout.

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TSD - 099OT TOP55 TOP50 TOP45 TOP40 **TOP35** TOP30 HSC - 50% dropout - AUROC TOP25 Smoothing Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM KMEAUS_MATRIX KMEANS_ROW GALLO EMD ELD BIKWEYNZ - 9.0 ЭОЯUА г.́ 0.9 0.8 0.7 0.4 0.3 0.2 0.1 0.0

Figura 29: Resultados para o problema HSC com e sem Spline, considerando AUROC e 50% dropout.

TSD - 099OT TOP55 TOP50 TOP45 TOP40 **TOP35** TOP30 HSC - 70% dropout - AUROC TOP25 Smoothing
Spline No Spline MEDIAN NA3M 09XAM 42XAM 02XAM $KMEAUS_MATRIX$ KMEANS_ROW GALLO EMD ELD BIKWEYNZ ЭОЯUА г.́ 0.9 0.8 0.7 0.6 0.4 0.3 0.2 0.1 0.0

Figura 30: Resultados para o problema HSC com e sem Spline, considerando AUROC e 70% dropout.

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