Estimating Subgraph Generation Models

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***Abstract*—Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.**

***Index Terms*—Networks, Graphs, ERGM, SUGM, Subgraphs**

I. Introduction

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II. Subgraph Generation Model

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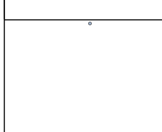
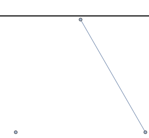
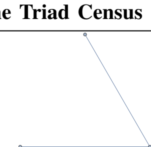
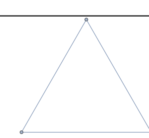
The observed network (left in Fig. 1) is the union of all subgraphs (right in Fig. 1), where the generated subgraphs may overlap. Multiple subgraphs may incidentally form additional structures such as triangles or squares.

TABLE I
Probabilities in the Subgraph Census

Model	Subgraphs of the Triad Census			
				
Links	p_L^3	$3\,p_L^2\,(1-p_L)$	$3\,p_L\,(1-p_L)^2$	$(1-p_L)^3$
Triangles	$p_T\,(p_T^{n-3})^3$	$3\,p_T\,(p_T^{n-3})^2\,(1-p_T^{n-3})$	$3\,p_T\,(p_T^{n-3})\,(1-p_T^{n-3})^2$	$(1-p_T)+p_T\,(1-p_T^{n-3})^3$
Links & Triangles	$p_T\,(p_L\,p_T^{n-3})^3$	$3\,p_T\,(p_L\,p_T^{n-3})^2\,(1-p_L\,p_T^{n-3})$	$3\,p_T\,(p_L\,p_T^{n-3})\,(1-p_L\,p_T^{n-3})^2$	$(1-p_T)+p_T\,(1-p_L\,p_T^{n-3})^3$

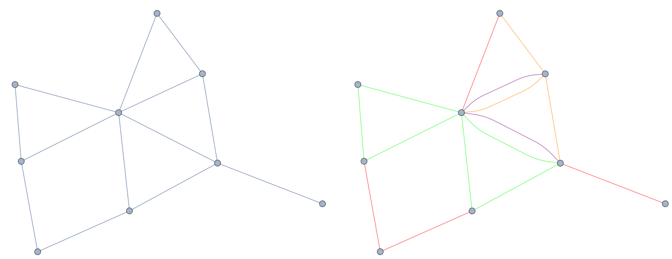


Fig. 1. The observed network (left) and the underlying, randomly generated links (red), 2-paths (purple), triangles (green) and 3-stars (yellow).

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$$f(x_1,\cdots,x_k;p_1.\cdots,p_k)=\frac{\Gamma(\sum_i x_i+1)}{\prod_i \Gamma(x_i+1)}\prod_{i=1}^{k}p_i^{x_i} \qquad (1)$$

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III. Further Research

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References

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